DISSERTATION ON

ASSESS THE PREVALENCE OF PERIPHERAL ARTERY DISEASE AND DIABETIC PERIPHERAL NEUROPATHY AMONG TYPE II DIABETIC CLIENTS RESIDING AT CHOOLAI IN CHENNAI AND TO PREPARE A HEALTH EDUCATION MODULE.

M.SC (NURSING) DEGREE EXAMINATION

BRANCH – IV COMMUNITY HEALTH NURSING

COLLEGE OF NURSING,

MADRAS MEDICAL COLLEGE, CHENNAI – 03.

A dissertation submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY,

CHENNAI – 600 032

In partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

APRIL - 2012

CERTIFICATE

This is to certify that this dissertation titled**, " Assess the prevalence of Peripheral Artery Disease and Diabetic Peripheral Neuropathy among type II Diabetic clients residing at Choolai in Chennai and to prepare a Health Education Module",** is a bonafide work done by Mrs. Sangeetha Viswanathan, College of Nursing, Madras Medical College, Chennai – 600 003, submitted to the Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of requirements for the award of the degree of Master of Science in Nursing, Branch – IV, Community Health Nursing under our guidance and supervision during the academic period from 2010 – 2012.

Dr. R. LAKSHMI, M. Sc,(N)Ph.D.,
Principal
College of Nursing,
Madras Medical College,
Chennai – 600 003.

Dr. V. KANAGASABAI, M.D.,
Dean,
Madras Medical College,
Chennai – 600 003.

DISSERTATION ON

ASSESS THE PREVALENCE OF PERIPHERAL ARTERY DISEASE AND DIABETIC PERIPHERAL NEUROPATHY AMONG TYPE II DIABETIC CLIENTS RESIDING AT CHOOLAI IN CHENNAI AND TO PREPARE A HEALTH EDUCATION MODULE.

Approved by Dissertation committee on _____

CLINICAL SPECIALITY GUIDE
Mrs. P. Sornam, M. sc., (N), _____
Reader, College of Nursing,
Madras Medical College, Chennai – 03.

MEDICAL EXPERT
Dr. A. K. Rajendiran, M.D, DPH., _____
Director, Institute of Community Medicine,
Madras Medical College,
Chennai – 03.

ZONAL MEDICAL OFFICER
Dr.P.Kalaiselvi. M.B.B.S, _____
Zonal Officer,
Pullianthope Zone, Corporation of Chennai,
Chennai- 12.

STATISTICAL GUIDE ___
Mr.A.Vengatesan, M.sc, M.phil, PGDCA,(Ph.D) _____
Lecturer in statistics, Department of statistics
Madras Medical College, Chennai-3

A dissertation submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY,

CHENNAI – 600 032.

In partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

APRIL - 2012

ACKNOWLEDGEMENT

T**he Lord gives wisdom, and from his mouth come knowledge and understanding.**

Proverbs 2:6

“Lord said my grace is sufficient for you, for my strength is made perfect in weakness.” First and fore most I express my deep sense of gratitude to the Lord Almighty for his blessings and mercies which enabled me to reach this step and complete my study.

The success of this study comes through the invaluable help, guidance and Contribution of some of the faculties, seniors, friends and other well wishers. The investigator recalls their kindness with a grateful heart and is trying to express these gracious feelings in a few words flowing from within.

I am immensely thankful to **Dr.Miss. R.Lakshmi M.sc (N), Ph.D, Principal,** College of Nursing, Madras Medical College , Chennai for her support, constant encouragement and valuable suggestions which has made this study a fruitful one.

I would like to extend my sincere thanks to **Dr.V.Kanagasabai. M.D, Dean,** Madras Medical College, Rajiv Gandhi Government General Hospital,Chennai-03 for providing necessary facilities and extending support to conduct this study.

It is a honor and pride for me to express my deep sense of gratitude to our former principal **Dr.Mrs.P.Mangala Gowri M.sc, (N) PhD** for her constant guiding spirit and consistent encouragement for my study.

I would like to express my gratitude to **Miss. Jenette Fernandes M.sc (N), Reader** for her guidance and constructive suggestions for my study

I also express my deepest and sincere thanks to **Dr. Mrs.K.Menaka.M.sc., (N) Ph.D** Reader, College of Nursing. Madras Medical College for her excellent inspiration towards the successful completion of this study.

I express my gratitude and appreciation to **Mrs.P. Sornam, M.Sc(N),Reader** and Head of the department, Community Health Nursing, College of Nursing, Madras Medical College, Chennai, for her suggestions, elegant direction and timely support through out the study.

I also put forth my sincere thanks to **Mrs. Elizabeth Kalavathy. M.sc (N),Lecturer.** College of Nursing .Madras Medical College.Chennai-3 for her guidance and support for this study.

My heartfelt thanks with sincere gratitude and respect to **Mrs. Rajeswari Vaidyanathan M.Sc(N), PhD**, principal, SRMC College of Nursing Porur for validating the contents of the tool of my study

I would like to express my special thanks to **Mrs.S. Kanagambujam.M.sc.(N).** Head of Department of Community Health Nursing, M.I.O.T. College of Nursing, Mugalivakkam who validated the content of the tool of my study.

It is my pleasure and privilege to express my deep sense of gratitude to **Dr.P.Kalai Selvi Zonal Medical Officer** who permitted me to conduct this study in Choolai (Urban) community area.

I extend my sincere thanks to **Mr.A.Vengatesan, M.sc, MPhil, PGDCA, (Ph.d)** Lecturer in Statistics, his excellent guidance, valuable suggestion and for helping me with the statistical analysis of the data.

I extend my deepest gratitude to the librarian **Mr. S. Ravi, MA, M.L.I .S.** College of Nursing, Madras medical College Chennai who helped me to avail library facility.

I am grateful to all my classmates, and my friends for their support, interest, encouragement, sacrifices as well as prayers there by making me successful in all the difficulties faced during the study.

My heartfelt thanks to all diabetic patients residing at Choolai urban community area in Chennai, for remaining as study samples and for extending their fullest co operation.

Finally, I am grateful to all who helped me in various capacities towards the successful completion of this study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

S.NO	Abbreviations
1	**PAD**-Peripheral Artery Disease
2	**DPN**-Diabetic Peripheral Neuropathy
3	**NIDDM**-Non Insulin Dependent Diabetes Mellitus
4	**LED**-Lower extremity disease
5	**T2DM**-Type- II Diabetes Mellitus
6	**IC**-Intermittent Claudication

ABSTRACT

This descriptive study aimed to assess the prevalence of Peripheral Artery Disease and Diabetic Peripheral Neuropathy among Type-II Diabetic clients residing at Choolai in Chennai and to prepare a health education module. The objectives of the study were to assess the prevalence of Peripheral Artery Disease, Diabetic Peripheral Neuropathy among Type – II Diabetic clients, to associate the selected demographic variables with the findings of Peripheral Artery Disease, Diabetic Peripheral Neuropathy, to correlate the findings of Peripheral Artery Disease with Diabetic Peripheral Neuropathy. The sample consisted of 300 subjects who are having diabetes mellitus for more than 3 years. Simple random sampling techniques were adopted to select the subjects. The tools were Diabetic Neuropathy Examination Scale, Ankle Brachial Index and Intermittent Claudication questionnaire. The prevalence of peripheral artery disease was 26% (78) and the prevalence of diabetic peripheral neuropathy was 32% (96). Diabetic complications were responsible for the development of PAD and DPN. There was substantial correlation between Peripheral Artery Disease and Diabetic Peripheral Neuropathy (k=0.64, P=0.001), because (22%) of clients had both Peripheral Artery Disease and Diabetic Peripheral Neuropathy and they were more prone to get foot ulcers. So the community health nurse and health workers should focus more on these complications and check the diabetic patient's foot regularly and teach them about foot care

Introduction

CHAPTER – 1
INTRODUCTION

‘ The medicalization of early diagnosis not only hampers and discourages the preventative health-care but it also trains the patient-to-be to function in the meantime as an acolyte to his doctor. He learns to depend on the physician in sickness and in health. He turns into a life-long patient’.

-- Ivan Illich.

Diabetes mellitus is a group of metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. It is a common chronic disease and also a public health problem that affects all levels of society, regardless of age, gender, ethnicity or race.

Diabetes mellitus is a chronic disease that causes hyperglycemia which is the hallmark of the disease. The deranged metabolism of carbohydrate, fat and proteins may eventually lead to the development of chronic micro vascular and macro vascular complications.

WHO has estimated that the global burden of type 2 diabetes mellitus for 2010 would be 285 million people which is projected to increase to 438 million by 2030. A study was conducted in India by Snehalatha et al (2009) showed that an increase is estimated to be 58% from 51 million people in 2010 to 87 million by 2030.

Hoskote and Joshi (2008) conducted a study to analyze the impact of type 2 diabetes mellitus. It increases morbidity and mortality and decreases the quality of life, At the same time the disease and its complications cause a heavy economic burden for diabetic patients themselves, their families and the society as well.

Diabetic patients develop the chronic complications of micro vascular and macro vascular complications. Microvascular complications are peripheral arterial diseases and diabetic peripheral neuropathy. More over many of the diabetic patients not aware of these complications end up with foot ulcers and in turn causes gangrene formation, thus resulting in lower extremity amputation.

Peripheral Artery Disease (PAD) is a common manifestation of systemic atherosclerosis. The most frequent symptom is intermittent claudication which results from poor oxygenation of the muscle of the lower extremities and is experienced typically as an aching pain, cramping or numbness in the calf, buttock, hip, thigh or arch of foot. Symptoms are induced by walking or exercise and are relieved by rest.

Marc Redell and Alan. T (2003) conducted a study on peripheral artery disease that the first recognizable symptom of PAD occurring in 40-50% patients is intermittent claudication characterized by pain on exertion that resolve at rest. They have estimated that the prevalence in individual below 50 years is 1-2%, whereas this percentage increases to approximately 5% for those above 50. The prevalence of intermittent claudication in those over 70years currently approaches 18%.

H. Zaveel and M.Halawa (2009) conducted study among diabetic patients and they are four times more likely to develop peripheral vascular disease and five time more likely to develop critical leg ischemia than the general population and they have estimated that 5-15% of diabetic individuals will undergo major leg amputation during their lifetime.

Diabetic neuropathy (DN) affects distinct regions of the nervous system, either singly or combined so it causes complex set of clinical syndromes. Distal symmetric polyneuropathy causes both small and large nerve fiber damages. It is usually the most common form of Diabetic neuropathy (DN). Small nerve fiber neuropathies occur early and are often present without objective signs or electro physiologic evidence of nerve damage.

Diabetic neuropathy is the most common form of neuropathy in the developed countries of the world, accounts for more hospitalizations than all the other diabetic complications combined, and is responsible for 50% to 75% of non traumatic amputations.

National health and nutritional examination survey (2002) study reported that the prevalence of disease including PAD, Peripheral Neuropathy, history of foot ulcer increase significantly with age from 12.3% in those aged 40-59, 26.2% in those aged 60-74 and 40.8% in those aged 75 and above.

Even though the urban people are working they are sedentary workers and they don't have any idea of foot care and preventive measures for foot ulcers and so it is the health workers duty to take care of those people and educate them about these complications and create awareness among diabetics.

The Indian population faces high risks for diabetes and its associated complications, because they have a genetic phenotype of low body mass index with high body adiposity, high body fat with increased insulin resistance and high genetic predisposition with high susceptibility. Early diagnosis of high-risk groups and appropriate intervention and lifestyle modification may be the solution for the disease burden.

The best ways to treat the complications of neuropathy and also for reducing the amputation rate are the new drugs which enhance nerve and blood flow. But Patient education and preventive strategies are the most important in the reduction of its impact on the quality of life and mortality as well.

The greatest risk of foot ulcers and subsequent gangrene formation can be prevented and thereby lower extremity complications delayed in early stage by life style modifications, regular exercise, dietary modification, regular treatment and periodical follow ups.

Establishment of Diabetes health care system is central to that of public health care for diabetics. There fore the government and public health workers should be aware of the potential problems of diabetes. Advancement in the control of T2DM is hampered by a health system that places a higher priority on communicable diseases, maternal and child health services. In addition to that private health system also focuses curative medicine.

Though diabetic prevention activities are cost-effective and should be the most important one. How ever Diabetic preventive action has been initiated, the efforts are weak and fragmented. Comprehensive national guidelines and protocol for health care services are still in adequate. Further, the variety of health care providers, including

standards for health facilities, personnel and treatment protocols, makes it difficult to monitor and assure that quality services are provided.

Tertiary care is emphasized at urban centres in the large cities and it is provided to the urban affluent. Government-run facilities are often crowded and under-resourced, even low- and middle-income patients prefer private care. For this population, as much as 25% of income can be spent on diabetes care

In India still we are lacking trained people in the field of public health care system. It is difficult to provide medical services in all areas to offer diabetic patients a variety of services pertaining to diabetic care. So the community health worker can reduce the burden of disease by providing guidance on nutrition, lifestyle changes, family support and counseling, treatment, and appropriate referrals.

NEED FOR THE STUDY

Diabetes mellitus is one of the major threats to human health in the 21st century. The world health organization (WHO) estimated that there were 135million diabetes in 1995, at present 246 million cases all over the world and this number would increase to 350 million by the year 2025. The global burden of increase is 2.8%. This will increase to 4.4% by the year 2025.

The prevalence of PAD in India is 4%. PAD in newly diagnosed diabetes cases were 3.5% and known diabetic cases were 7.8%. It is thought that 10% of patients with intermittent claudication progress to critical limb ischemia and 2% require amputation. Intermittent claudication is estimated to occur in 4.5% of people between 55 and 74yrs. Its prevalence increases with age.

Mohan et al (2006) conducted study in Chennai and reported that 14.3% of people are having diabetes. Ramachandran et al (2008) conducted study in south India and reported that 18.6% of people are having diabetes mellitus.

Premalatha et al (2006) conducted study in Chennai reported that 6.3% of people are having peripheral vascular disease. Pradeepa et al (2004) conducted population based study in Chennai and reported 26.1% of people are having peripheral neuropathy.

V. Mohan and Premalatha et al (1995) conducted study among diabetic patients in south India. 390 out of 4941 patients (8.9%) had evidence of PVD and there was slight female excess in PVD patients. There was a linear increase in prevalence of PVD with increasing duration of diabetes.

Hyman Gaylis et al., (2002) conducted study among 300 diabetic patients and found that Sensory neuropathy increases the risk of foot ulcerations by seven folds and peripheral arterial disease (PAD) by three folds in people with diabetes. Both sensory neuropathy and PAD are highly prevalent in our diabetic subjects, more in persons with foot ulceration. Increasing age, duration of diabetes, poor glycemic control and smoking are strong risk factors for development of sensory neuropathy and PAD.

Peripheral neuropathy is a common disorder among diabetics. 20% of adult diagnosed with diabetes have at least one manifestation of Diabetic Peripheral Neuropathy. Peripheral nerve damage occur as many as 25% of people with diabetes mellitus ,for over 10 years of diagnosed with diabetes and in as many as 50%of patients who have had the disease.

Chronic complications of diabetes include peripheral neuropathy causes foot ulcers and lower extremity complications like charcot joints eventually lead to amputations; and autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction. Patients with diabetes have increased risk of developing atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease.

Thavintharan et al,(2004) conducted study among diabetes to know the prevalence. The study shows that about 1 in 10 Asian Malay adults aged 40–80 years with diabetes in Singapore had PAD and they found that Malay patients with diabetes and

PAD was associated with older age, female gender, hypertension, smoking , history of myocardial infarction and stroke, and higher mean systolic blood pressure. These risk factors are similar to other populations, suggesting that controlling the modifiable factors may reduce the prevalence of PAD in Asia.

Diabetes is a common disease that is associated with numerous complications, including foot ulceration and amputation. In diabetic patients, the incidence of foot ulcers ranges from 1.0% to 4.1%, and the incidence of lower-extremity amputations ranges from 2.1 to 13.7 per 1000. Risk factors for developing foot ulcers and subsequent amputation include neuropathy, peripheral vascular disease, and trauma. To reduce these complications, several preventive strategies have been devised, from reducing risk factors for improving treatment and management.

Among persons diagnosed as having diabetes mellitus, the prevalence of foot ulcers is 4% to 10%, the annual population-based incidence is 1.0% to 4.1%, and the lifetime incidence may be as high as 25%. These ulcers frequently become infected, cause great morbidity, endanger considerable financial costs, and are usually first step to lower extremity amputation.

The Investigator while going for home visit to Choolai community area in Chennai, found that many of them are having diabetes mellitus and also on treatment. But they are not aware of the complications of diabetes mellitus. So the investigator interested to do this study in Choolai area.

The investigator aim is to identify the cases who are at risk and bring about the important changes in the health of Diabetic population, based on promoting healthy life styles. Apart from this the investigator can manage the high risk group with prompt intervention to prevent the development of complications in Diabetic affected individuals.

Now a days urban health nurses are focusing more on maternal and child care activities and they neglect non communicable disease like diabetes .So all patients with diabetes should be screened for PAD every year irrespective of symptoms. Screening can at

best be carried out in the primary care settings depending on how services are developed locally; screening can be undertaken by health workers working in the community.

The community health nurse can check foot pulses, look for ulcers and callouses and educates patients with diabetes regarding appropriate shoes. In order to evaluate the health care provided for diabetic population, there is need to establish evidence based services for effective prevention, Diagnosis and treatment.

Screening in primary care will ensure intermittent claudication in patients with diabetes and is picked up before it is hidden by other complications. Patient presenting with calf muscle pain could be assessed for intermittent claudication. Intermittent claudication is the most common form of peripheral artery disease, patient may also be presented with foot ulcers or ischemia, although many symptoms arise due to neuropathy.

There is real deficiency of diabetic awareness programme in India because of low coverage. If accounts were taken of the relevant social and economic settings the diabetes awareness program for self management of diabetes could reduce the cost and resources. On the other hand Indian urban design and transportation policies contribute to physical inactivity by encouraging the use of private cars and by making walking and cycling less feasible.

It is also therefore important to screen all our diabetic patients for PAD, IC and foot ulceration, check their feet regularly and educate them to look out for symptoms of these conditions. So patient showing intermittent claudication symptoms could be actively managed and should be particularly encouraged to practice good foot care.

After observing all these scenarios the investigators has selected this study and conducted in urban community area at Choolai in Chennai.

PROBLEM STATEMENT

Assess the prevalence of Peripheral Artery Disease and Diabetic Peripheral Neuropathy among Type-II Diabetic clients residing at Choolai in Chennai and to prepare a Health Education Module.

OBJECTIVES

1. To assess the prevalence of Peripheral Artery Disease among Type – II Diabetic clients.
2. To assess the prevalence of Diabetic Peripheral Neuropathy among Type – II Diabetic clients.
3. To associate the selected demographic variables with the findings of Peripheral Artery Disease.
4. To associate the selected demographic variables with the findings of Diabetic Peripheral Neuropathy.
5. To correlate the findings of Peripheral Artery Disease with Diabetic Peripheral Neuropathy
6. To prepare a Health Education Module on Peripheral Artery Disease and Diabetic Peripheral neuropathy

OPERATIONAL DEFINITION

Assessment

Checking patients using Diabetic Neuropathy Examination scale, Ankle Brachial Index and Intermittent Claudication Check List.

Prevalence

Presence of new and old cases of Peripheral Artery Disease and Diabetic Peripheral Neuropathy

Type – II Diabetes Mellitus

Chronic type -II diabetic patients who are on treatment of oral hypoglycemic agent for more than three years

Diabetic Peripheral Neuropathy

Type –II diabetic patients examined with diabetic neuropathy examination scale scoring more than three.

Peripheral Artery Disease.

Patients having Ankle Brachial Index less than 0.9 and also with the symptom of intermittent claudication pain.

.

Health Education Modules

It is an instruction module regarding Peripheral Artery Disease and Diabetic Peripheral Neuropathy and prevention of foot ulcers.

HYPOTHESIS

- There is significant relationship between Diabetes Mellitus and Peripheral Artery Disease.

- There is significant relationship between Diabetes Mellitus and diabetic Peripheral Neuropathy.

ASSUMPTION

- Chronic Diabetic patients are prone to get Diabetic Peripheral Neuropathy.

- Diabetic patients are prone to get Peripheral Artery Disease.

DELIMITATION

This study is limited to,

1. Diabetic patients residing only at Choolai in Chennai.
2. Only one month data collection period

Review of Literature

CHAPTER- II

REVIEW OF LITERATURE

Review of literature is a broad, comprehensive, in depth, systematic and critical review of scholarly publications, unpublished scholarly print materials audio visual materials, and personal communications—**Basavanthappa.B.T**

Review of literature thus provides a knowledge base for proceeding research.

The reviewed publications have been organized and presented as follows,

Part -I

A – Literature related to Peripheral Artery Disease

B – Literature related to Diabetes Mellitus and its complications

C – Literature related to Diabetic Peripheral Neuropathy.

D - Literature related to prevention of complications

Part-II

Conceptual frame work.

PART - I

LITERATURE RELATED TO PERIPHERAL ARTERY DISEASE

Jam Board et al (2011) conducted study to know the management of peripheral arterial disease and intermittent claudication among 356 diabetic clients in Boston. Symptoms of intermittent claudication are induced by walking or exercise and usually resolve with rest. Disease severity varies from patients who have symptoms to those who have unremitting symptoms. Treatment of PAD is aimed at maintaining or improving functional status, reducing or eliminating ischemic symptoms and preventing disease progression. Exercise and aggressive risk factor modification represents the corner stones of treatments. Risk factors include smoking, diabetes, lipid abnormalities, and hypertension. Antiplatelet and lipid altering therapies decrease the risk of atherosclerotic vascular complications and are being studied to improve intermittent claudication

Vogt. MT et al (2010) conducted study among 1492 elderly women with lower extremity arterial disease likely to report difficulty with one another than women free of this disease. Only difficulty with walking 2-3 blocks remained highly correlated with disease (relative risk (RR) 2.8, 95% confidence interval (CI) 1.6, 4.8). Several measures of physical activities were inversely and independently related to low AAI. Muscle strength in the hip, arm, knee and hand and measures of static and dynamic balance were co related with low AAI in the univariate analysis. Women with mild predominantly sub clinical, lower extremity arterial disease living in the community have decreased functional status and mobility.

Jeffrey et al (2009) conducted study among 1592 men and women to know the diagnosis and treatment of chronic arterial insufficiency of the lower extremities in Edinburgh. This epidemiological studies indicate that up to 5%of men and 2.5% of women 60 years of age or older have symptoms of intermittent claudication. The prevalence is at least three fold higher when sensitive non invasive test are used to make the diagnosis of arterial in sufficiency in asymptomatic and symptomatic individuals.

Kelly R et al (2008) conducted study to know the peripheral vascular disease and peripheral neuropathy among 2514 adult aged >40 yrs individual with cardio metabolic clustering and obesity in Michigan. Over all 9% of individuals had peripheral neuropathy alone, 8.5% had PVD alone and 2.4% had both LED. The obese group was more likely to have peripheral neuropathy compared with non obese subjects without clustering, within the obese group clustering increased the odds of peripheral neuropathy compared with none clustering. Obesity and clustering markedly increased the likelihood of lower extremity disease and identified a group for whom preventive activities may reduce the risk of future disability.

Jeffrey W et al (2006) conducted study in person aged 60 and older among 3947 men and women to know the prevalence of peripheral artery disease and risk factor in Newyork.12% of the adult population has PAD and the prevalence is equal in men and women. Strong association exists between advancing age, the prevalence of PAD almost 20% of adults older than 70 years, 13% in an elderly hypertension population from the systolic hypertension in the elderly programme. In fact, asymptomatic disease may be present up to 50% in patients with PAD, 460 patients in the walking and leg circulation study, 19.8% had no exertional leg pain, 28.5% had typical leg pain, 32.6% had classic intermittent claudication, and 19.1% had pain at rest.

Edward W et al (2006) conducted study to assess the prevalence of lower extremity diseases among 2873 adult population with or without diabetes in U.S. The main outcome measures consisted of the prevalence of lower-extremity PAD (defined as ankle-brachial index <0.9), PN (defined as ≥1 insensate area based on monofilament testing), and of any LED (defined as PAD, PN, or history of foot ulcer or lower-extremity amputations). Population aged >40 years 4.5% have lower extremity PAD, 4.8% have PN and 18.7% have any LED. Prevalence of PAD, PN and over all LED increases steeply with age and duration of illness. The prevalence of LED is approximately twice as high for individuals diagnosed with diabetes, PAD is 9.5% and PN is 28.5%. LED is common and twice as high among individuals diagnosed with diabetes.

REVIEWS RELATED TO DIABETES MELLITUS AND ITS COMPLICATION

Ms. Thamilselvi R et al (2011) conducted a study to assess the foot self care behavior among patients with diabetes at selected diabetic centres in Chennai. 60 samples with DM have been selected by non probability convenience sampling technique. Only 33.3% of the samples inspect their feet always. 85% of the samples never use mirror to inspect their feet. Only 26.6% of the sample always inspects their feet for calluses. 46.7% of the samples never checked their feet for warmth.

Nalini Singh et al (2011) conducted a study to prevent foot ulcers among 3456 patients with diabetes in Seattle. Prevention of diabetic foot ulcers begins with screening for loss of protective sensation. Brief history and the semmens-weinstein monofilements specialist may quantify neuropathy with biothesometry and lower artery vascular and ankle brachial indices. These measurements are in conjunction with other findings from the history and physical examination enable clinician to satisfy patients based on risk and to determine the type of interactions. Educating patients about proper foot care and foot examination are effective interactions to prevent ulceration. Effective clinical interactions include optimizing glycemia control, smoking cessation, intensive periodic care, debriment of calluses and prophylactic foot surgery.

Mintao et al (2009) conducted study among 1062 diabetic clients to know the relationship of poly unsaturated fatty acid intake to peripheral neuropathy by the national health examination survey in U. S. The mean dietary intake of linolenic acid was 1.25 – 0.07 gm among peripheral neuropathy, significantly lower than 1.45 – 0.05 g intake among those without peripheral neuropathy. After controlling for potential confounding variables, adults whose linolenic acid intake was in the highest quantile had lower odds of peripheral neuropathy than adult in the lowest quantile. Among adults with diagnosed diabetes, dietary intake of linolenic acid is positively associated with lower odds of peripheral neuropathy.

David J Margolis et al (2008) conducted a study among diabetic clients to know the association between renal failure and diabetic foot ulcers in Philadelphia. The presence of diabetic foot ulcer and estimated glomerular filtration rate are evaluated in 90, 617 individuals with a median observation of 2.4 years. In this Cohort study 378 individuals had LEA and 2619 had DFU, CKD was noted in 23350 (26%) individuals. There is a strong association between stage of CKD and DFU or LEA that is probably not just related to the presence of peripheral arterial disease.

Judy K et al (2007) conducted a study among 39 diabetic patients with diabetic peripheral neuropathy to the effect of monochromatic infrared energy on sensation in

Memphis. Subjects with diabetic peripheral neuropathy completed the 8-week study. They received 30 min of active or placebo MIRE three times a week for 4 weeks. Plantar sensation was tested with monofilaments at the beginning of the study (M1), following 4 weeks of treatment (M2), and after an additional 4 weeks of nontreatment (M3). The average number of sites that the patients could sense was 5.07 monofilament increased for both active and passive groups. There were significant gain from M1 to M2 and no significant gains from M2 to M3 and M1 to M3 for both active and placebo groups. Thirty minutes of active MIRE applied 3 days per week was no more effective than placebo MIRE in increasing sensation in subjects with diabetic peripheral neuropathy.

Charles et al (2006) conducted study among 6500 diabetes to know the neuropathy pain in United States. Diabetic peripheral neuropathy is estimated to be present in 50% of people living with diabetes mellitus. Neuro vascular and micro vascular changes also interact with DPN and affects it course. In patient with DM, the DPN is the leading cause of foot ulcer, which in turn is a major cause of amputation in diabetes. Although most patients with DPN do not have pain, approximately 11% of patients with DPN have chronic painful symptoms that diminishe quality of life, disrupt sleep and can lead to depression.

Nail Snowling et al (2006) conducted study among 1003 type II diabetic clients to find out the effects of different models of exercise training on glucose control, risk factors for complications at Auckland, Newzeeland. Differences among the effect of aerobic, resistances and compared training on HbA1c were trivial for training lasting >12 weeks. The over all effect was a beneficial reduction (A1C 0.8 ± 0.3% [mean ± 90% confidence limit]). There were generally small to moderate benefits for others measures of a glucose control. For other risk factors, these were either small benefits or effects were trivial or non clear. All forms of exercise training procedures were small in the measures of glucose control. AIC effects are similar to those of dietary, drug and insulin treatments.

Asis-ul-Hassan et al (2006) conducted study to know the Prevalence of peripheral arterial disease among 830 type 2 diabetics in Pakistan. The prevalence of peripheral arterial disease was 31.6%. There was no significant difference in the proportion of low ABI between males (30%) and females (33%). Patients with low ABI were found to have significantly higher BMI and waist circumference .The most common symptom in the patients with low ABI was pain on walking (84%), followed by numbness of the feet (64%). Association was found between age, low ABI, duration of diabetes mellitus and cigarette smoking

REVIEWS RELATED TO PERIPHERAL NEUROPATHY

NAHES,(2010) conducted study to know the Mobility Limitation Among 6059 Persons Aged 40 Years with and without Diagnosed Diabetes and Lower Extremity Disease in United States. Lower extremity disease (LED), which includes Peripheral Arterial Disease (PAD) and Peripheral Neuropathy (PN), increases the risk for mobility limitation. The age-adjusted prevalence of mobility limitation among adults with diagnosed diabetes was greater than for those without diagnosed diabetes overall (27% and 16%, respectively) and in each age and sex group. The age adjusted prevalence of mobility limitation among those with LED was also greater than for those without LED overall (26% and 15%, respectively) and in each age and sex group.

Probal K et al (2009), conducted study among 185 diabetic clients to know the Amputation and Mortality in New-Onset Diabetic Foot Ulcers in Liverpool. Out of the 185 patients studied, 41% had peripheral vascular disease (PVD) and 61% had neuropathy; 45%, 16%, and 24% of patients had neuropathic, ischemic, and neuro ischemic ulcers, respectively. The mean follow-up period was 34 months including survivors and patients who died during the study period. Five-year amputation rates were higher for ischemic (29%) and neuroischemic (25%) than neuropathic (11%) ulcers. Five-year mortality was 45%, 18%, and 55% for neuropathic, neuroischemic, and ischemic ulcers, respectively. Mortality was higher in ischemic ulcers than neuropathic ulcers. On multivariate regression analysis, only increasing age predicted shorter survival time.

Andreas Mielck et al (2008) conducted a study to know the prevalence of poly neuropathy among 393 pre diabetes and diabetes at Ausburg, Germany. Among the subjects 46 had IGT, 71 had IFG and 81 had NGT. The prevalence of poly neuropathy was 28% in the diabetic subjects, 13% those with IGT, 11.3% in those with IFG and 7.4% in those with NGT. In the entire population studied age, waist, circumference and diabetes were independent factors significantly associated with poly neuropathy whereas in the diabetic group poly neuropathy was associated with age, waist, circumference and peripheral arterial disease.

Elsa.s et al (2008) conducted study to know the relationship of reduced Peripheral Nerve Function with Diabetes and Physical Performance among 2364 Older White and Black Adults at Pittsburgh, Pennsylvania .Sensory and motor peripheral nerve function in legs/feet was assessed by 10- and 1.4-g monofilament perception, vibration detection, and peroneal motor nerve conduction amplitude and velocity. Diabetic participants had fewer chair stands (0.34 vs. 0.36 stands/s), shorter standing balance time (0.69 vs. 0.75 ratio), slower usual walking speed (1.11 vs. 1.14 m/s), slower narrow walking speed (0.80 vs. 0.90 m/s), and lower performance battery score (6.43 vs.6.93) (all P _ 0.05). Peripheral nerve function was associated with each physical performance measured independently. After addition of peripheral nerve function in fully adjusted models diabetes remained significantly related to a lower performance battery score and slower narrow walking speed. Poor peripheral nerve function accounts for a portion of worse physical performance in diabetes and directly associated with physical performance.

K.Rabia et al (2007) Conducted study to know the Prevalence of Peripheral Arterial Disease, Diabetic peripheral neuropathy among 200 Patients with Diabetes Mellitus in a Primary Care Setting in Malaysia**.** The prevalence of PAD was 16% (n=32, ABPI < 0.9). The prevalence of peripheral neuropathy was 41%. There was significant association found between age, gender, ethnic groups, duration of DM, HbA1C levels, gangrene, smoking, hypertension, dyslipidaemia, and PAD in these diabetic patients.

Premkumar (2006) conducted study to know the efficacy of neuromuscular facilation in improving sensory motor function among 60 diabetic peripheral neuropathy clients. The significant difference between the Pre and Post treatment Diabetic Neuropathy Examination scores shows that the percentage of Diabetic Sensorimotor polyneuropathy (DSP) has been considerably reduced from 36.51% to 31.65% ($p<0.01$). The mean muscle strength of Quadriceps has been significantly improved from 3.17 ± 0.53 ($p<0.01$) to 3.77 ± 0.43 ($p<0.01$). The mean muscle strength of Tibialis Anterior has been significantly improved from 2.63 ± 0.49 ($p<0.01$) to 3.17 ± 0.69 ($p <0.01$). Proprioceptive Neuro muscular Facililation producing improvements in the muscle strength does not contribute to any significant variations in all the sensory components of Diabetic neuropathy (DN). This study implies that the PNF can be made used to improve the motor component of the Diabetic neuropathy (DN).

REVIEWS RELATED TO PREVENTION OF DIABETES RELATED COMPLICATION

Fujiwara Y et al (2011) conducted study to know the beneficial effects of foot care nursing for people with diabetes mellitus with the aim to assess the effectiveness of a preventative foot care nursing programme for diabetic patients. They developed a diabetic foot care programme based on the international working group on the diabetic foot and studied 88 patients who attended foot care programme for 2 years. Patients were divided into four groups according to the risk classification and received foot care.

They evaluated the incidence of foot ulceration or recurrence and non –ulcerated foot condition. Characteristics of the patients were analyzed using the paired t – test and Mc Nemear's test and changes in severity of tinea Pedis and grade of callus were analyzed using Wilcoxon's signed rank sum test. The programme reduced the severity score of tinea pedis ($P<0$ – OT.001) and improved callus grade ($P<$OT.oo1). None of the patients of risk –group-3 (history of foot ulceration) showed recurrences of callus-related foot ulcers.

Vanitha (2010) conducted study to know the effectiveness of papaya vs. honey dressing on diabetic foot ulcers among diabetic patients in selected hospitals at Sivakasi. 300 diabetic patients with foot ulcers were selected out of which 15 were experimental group 1, 15 were experimental group 2. Bates Jenson wound assessment was used to assess the condition of foot ulcers. Papaya and honey dressing ,done at the duration of 13 minutes once a day for one week. There is significant reduction in the score from 57 to 42 in honey dressing whereas in papaya dressing there is significant reduction in the score from 52 to 38. It shows both are effective in treating foot ulcers but honey is effective than papaya.

Umalakshmi (2010) conducted a study to assess the effectiveness of nursing care on home management of diabetics among clients residing at Acharapakkam. 30 adults with diabetes mellitus have been selected by simple random technique. Nursing intervention rating scale for adults has been used to check the few characteristics. There is significant difference in the pre test (30.4) and post test (19.1) of rating scale.

Nisha Wilson (2009) conducted a comparative study to assess the effectiveness of application of betadine solution vs. super oxidized solution on wound dressing among diabetic patients with foot ulcers. 50 diabetic patients with foot ulcers have been selected among that 25 patients were selected for betadine application from Joseph hospital. 25 patients were selected from Dominique hospital. Convenient sampling technique has been used to select the samples. There is significant difference after the application of betadine dressing from 42.4 to 25.48. Significant difference before and after the application of super oxidized solution is from 41.64 to 19. It shows both are effective in treating foot ulcers but super oxidized solution is very effective than the betadine.

Vetriselvi (2009) conducted study to know the effectiveness of infra red lamp therapy among clients with diabetic foot ulcer in Adhiparasakthi Institute of medial sciences at OPD and male female surgical ward. 300 diabetic patients with foot ulcers have been selected by convenient sampling technique. Bates Jenson wound assessment scale has been used to assess the effectiveness of infra red lamp therapy and she found

that there is significant reduction in the score value from 53.2 to 27.9 after the treatment with infra red therapy.

Patout CA et al (2008) conducted study to compare patient outcomes 1 year before and after enrollment in a comprehensive diabetes lower-extremity amputation prevention program, among 197 patients who were enrolled in the Louisiana State University health sciences centre diabetes foot program which provides foot care. Data was obtained using a structured interview administered by a registered nurse. Data was obtained from all patients at the initial visit and through the 1-year follow up. Analysis of data showed a reduction in foot-related ulcer days (49%), hospitalization (89%) Hospital days (90%), emergency visits (81%), lower extremity amputations (79%) and missed workdays (70%) after 1 year of comprehensive foot care compared with the 1-year period before treatment. This single cohort outcome study showed a large reduction in the foot-related complications after the first year of comprehensive preventive foot care.

Dargis V. et al (2008) conducted study to assess the ability of a multidisciplinary approach of diabetic foot care to reduce the incidence of recurrent ulceration and amputation compared with standard care. This is a 2 year prospective study conducted among 145 patients with a past history of naturopathic foot ulcers. Subjects were screened for their naturopathic and vascular status at baseline and all received identical foot care education. The intervention group (n=56) was followed by the multidisciplinary team of physicians, nurses and provision of specialty foot wear as required. The standard treatment group was followed in local clinics on a tri monthly basis and received identical screening and education at baseline. The study has demonstrated the effectiveness of a multidisciplinary approach to diabetic foot care together with the provision of speciality foot wear was very effective in the long term management of high risk patients

Rasli MH et al (2008) conducted study on foot problems and effectiveness of foot care education among 557 children and adolescents with type 1 and 2 diabetes mellitus. Patients attended clinics; examination was performed at baseline and follow-up done. Patients and parents were given oral and written advice regarding foot care. The

majority foot problems found at first assessment was potentially modifiable disorders of skin and nails (68.8%).The remainders (31.2%) were structural musculoskeletal disorders requiring referral to a podiatrist/orthotist. A total of 532 foot problems were recorded at baseline in a cohort of 557 patients and 161 foot problems at follow-up of 312 patients. Significant reduction of modifiable foot problems was seen at follow-up, particularly in those with longer duration of diabetes and in those whose body mass index was higher. This study highlights the importance of foot examination and foot care for children and adolescents with diabetes.

AMJ Med. et al (2008) conducted study to evaluate the effectiveness of home temperature monitoring to reduce the incidence of foot ulcers in high-risk patients among 225diabetic patients. They were divided to standard therapy group and dermal thermometry groups. Both groups received therapeutic foot wear, diabetic foot education. Thermometry group subjects used an infrared skin thermometer to measure temperatures on 6 feet sites twice daily. Temperature differences >4 degrees F between left and right corresponding sites, triggered patients to contact the study nurse and reduce activity until temperature normalized. Total of 8.4% (n=19) subjects ulcerated over the study period. Subjects likely to ulcerate in the dermal thermometry group compared with the standard therapy group (12.2%) Patients ulcerated had a temperature difference that was 4.8 times greater at the site of ulceration in the week before ulceration with random 7 consecutive-day sample of other subjects that did not ulcerate (p=.001). High temperature gradients between feet may predict the onset of neuropathy ulceration and self-monitoring may reduce the risk of ulceration.

Velmurugan (2007) conducted a study to assess the effectiveness of topical application of unripe papaya pulp on healing of foot ulcers. 106 patients with diabetic foot ulcers have been selected, in that 53 were experimental and 53 were control group. Simple random technique has been used to select the sample. Bates Jenson wound assessment tool has been used to assess the 14 wound characteristics. There was significant change 2.45 (P = 0.001) in the wound score between experimental (37.59) and control group (40.04).

Walsh JS, et al (2007), conducted study to determine the identification of co morbidities that would impact the development of facility-acquired pressure ulcers (FAPU) of the heel among 242 adult diabetic patients (46 in the intervention groups and 196 in the control groups) The study was conducted in 4 phases, including a introspective chart audit, 2 prospective interventions and a product evaluation. Risk factors for development of heel ulcers during hospital stay or prior to admission included type 2 diabetes mellitus (T2DM), peripheral vascular disease (PVD), low albumin and Braden scale score. During the phase 3 FAPU prevalence assessment, 3 patients had facility-acquired heel ulcers. During phase 4, there were significant preferences for the trial heel pressure relief device as well as patient and staff satisfaction. Pressure ulcer prevention protocol that incorporated accurate assessment of risk factors with frequent documentation of heel skin integrity which had a positive impact on the incidence of heel FAPU. Early aggressive implementation of pressure-reducing and pressure-relieving devices was effective in reducing FAPU.

Litzelman. DK et al (2006) conducted study to know the reduction of lower extremity clinical abnormalities among 352 diabetic patients with non-insulin-dependent diabetes mellitus in U.S.A. Patients receiving the intervention were less likely than control patients to have serious foot lesions (baseline prevalence, 2.9%; odds ratio, 0.41 [95% CI, 0.16 to 1.00]; $P = 0.05$) and other dermatologic abnormalities. Also, they were more likely to report appropriate self-foot-care behaviors, to have foot examinations during office visits (68% compared with 28%; $P < 0.001$), and to receive foot-care education from health care providers (42% compared with 18%; $P < 0.001$). Physicians assigned to intervention patients were more likely than physicians assigned to control patients to examine their feet for ulcers, pulses, and abnormal dermatologic conditions.

Ramarthilagam, (2006) conducted a study to asses the local application of honey on diabetic wounds at Ramakrishna hospitals in Coimbatore. 106 diabetic patients have been selected by purposive sampling technique. Modified bates Jenson wound

assessment tool has been used to assess the wound characteristics. There is significant reduction in wound score from 55 to 27 after the local application of honey.

Lavery LA, et al (2006) conducted study to demonstrate the effectiveness of a diabetic foot disease management program in a managed organization. Screening consisted of evaluation of neuropathy, peripheral vascular disease, deformities, foot pressure, and history of lower extremity pathology. They stratified patients into low and high –risk groups and implemented preventive or acute care protocols. Utilization was tracked for 28 months and compared to 12 months of historic data prior to implementation of the disease management program. After they implemented the disease management program, the incidence of amputations decreased 47.4% from12.89/1000 diabetic per year to 6.18 ($P<0.05$). The number of foot-related hospital admission decreased 37.8% from 22.86 per 1000 members to 14.23 (37.8%). The average inpatient length-of-stay (LOS) was reduced 21.7% from 4.75 to 3.72 days ($P<0.05$). 38.2% reduction in the average SNF (admission per 1000 member per year). LOS from 8.72 to 6.52 days ($P<0.05$). A population – based screening and treatment program for the diabetic foot can dramatically reduce hospitalizations and clinical outcomes.

Waxman R. et al (2006) conducted study to know the effectiveness of podiatry (Chiropody) services. Randomized clinical trail with blinded 6-month follow-up and economic evaluation for People aged 60+ seeking self-initiated or primary referred podiatric consultations were screened. One hundred and fifty three were included on the basis of health status. Seventy eight were randomized to receive a self-management program and 75 for usual cares. The main outcome measure foot disability, as measured by the Manchester foot disability questionnaire. At 6 months, self management program participant had lower foot disability scores than the usual care group. The cost per patient for the self-management program was found to be the same as for usual care.
In this group a self care program for routine foot care did not compromise with therapeutic outcomes of self management programme.

Corbett CF et al (2006) conducted study to test the effectiveness of an educational intervention to improve patient's foot care knowledge, self efficacy and self-care practices. A prospective, randomized single centre, 2 groups design was used with a convenient sample of 40 home care patients from a Medicare-certified home health agency. Baseline measures of foot care knowledge, self-efficiency and reported self care practices were obtained at study entry and 6 weeks later to control group for foot care interventions provided during routine home care services. After obtaining the 6 week baseline measures, patients who were randomized to the intervention group received individualized education about proper foot care. A brief individualized educational intervention about standard foot care topics improved patients' foot care knowledge and self efficacy as well as reported self-care practices. Incorporating such interventions into routine home care services may enhance the quality of care and decreases the incidence of lower extremity complications.

PART - II

CONCEPTUAL FRAME WORK

THE HEALTH BELIEF MODEL

The health belief model was developed to provide frame work to explain why some people take specific actions to avoid illness while others try to protect them. This model was designed by Hoch baum (1958) modified and used by Kegels (1965) Rosen stock (1974), Becker. M (1974).The model addresses the relationship between a person's belief and behavior .It provides a way of understanding and predicting how clients will behave in relation to their health and how they will comply with health care therapies.

Individuals are most likely to engage in preventive health behavior, they perceived that they may susceptive to an illness or injury (Franzand Becker 1974). There are two components in the model, perceived barriers and perceived susceptibility appears to be the most important variables for health promotion intervention. Health belief model is directed more towards health protecting behavior. This behavior protects persons from problems that endanger their health and wellbeing rather than behavior that improve health by fostering personal development of self care.

This model is divided in to three major components.

a. Individual perception

b .Modifying factors (Contributory factors)

c. Variables affecting the likelihood of imitating actions

INDIVIDUAL PERCEPTIONS

They are the views of susceptibility to disease and the seriousness of the disease combine to form his or her perceived threat of an illness. E.g. A client needs to recognize familial link of Diabetes Mellitus particularly, when one parent and two siblings have died in their fourth decades from Diabetes Mellitus, the client may perceive the risk of Diabetes Mellitus and its complications.

CONTRIBUTORY FACTORS

It includes demographic variables such as age sex, educational status, occupation, Income, type of family, family history, duration of illness, smoking and diabetic interference in the normal life. Cues of actions are health education regarding prevention of diabetic complications, demonstration of foot care.

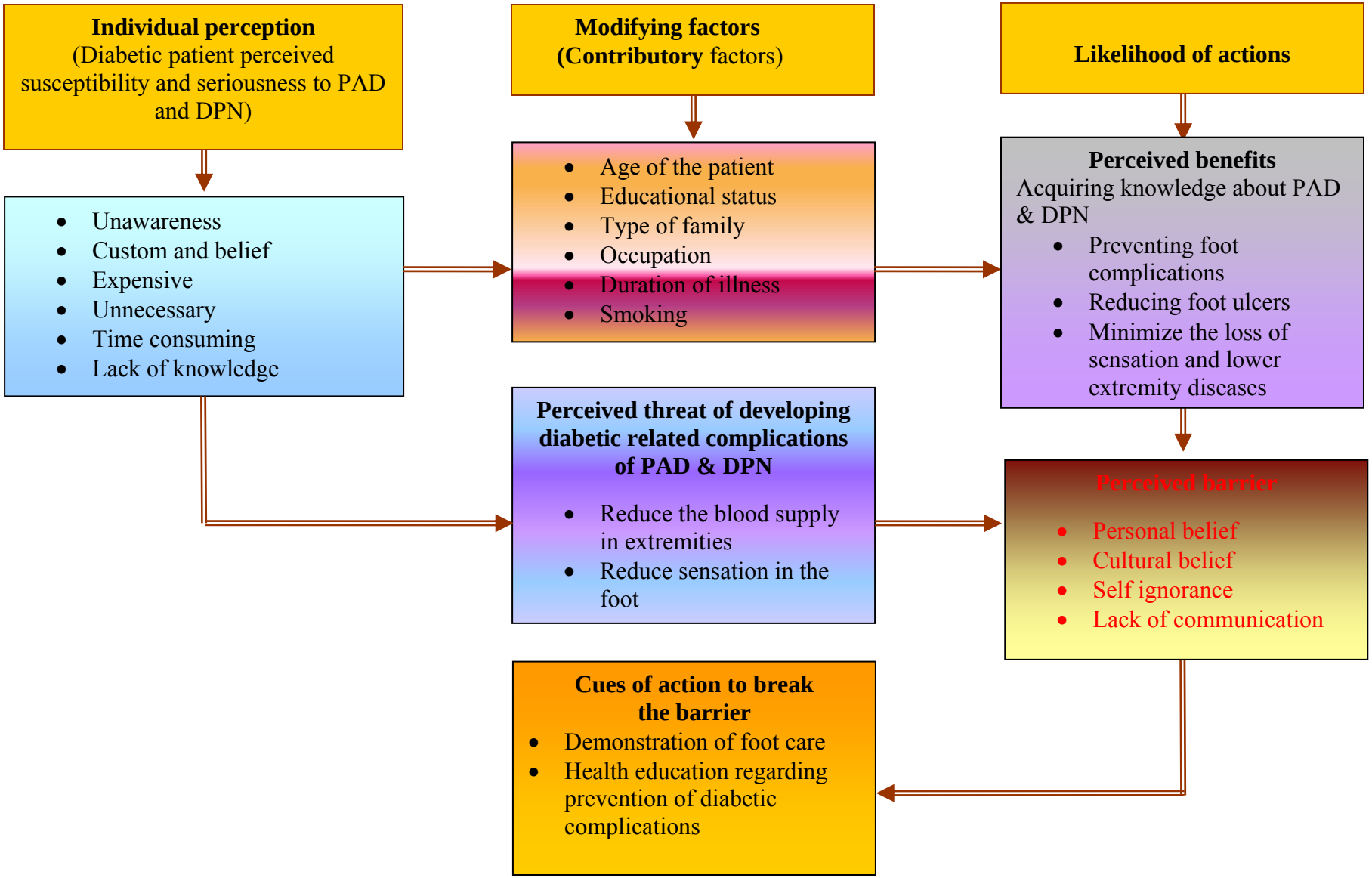
LIKELY HOOD OF ACTION

This is influenced by the perceived benefits of action weighed against the barriers to acting, e.g. acquiring knowledge about PAD & DPN thereby preventing foot complications, reducing foot ulcers, minimize the loss of sensation and lower extremities disease. Perceived barriers are family belief, cultural belief, self ignorance and lack of communication.

ADVANTAGES

1. It is useful in health protecting or disease preventing behavior.
2. It is useful in organizing information about client's view of their health status and factor which would influence them to change their behavior.
3. This can be used to determine their perception risk of the disease and their knowledge of the disease

FIG – 1: MODIFIED BECKER'S HEALTH BELIEF MODEL (1974)



Research Methodology

CHAPTER- III

METHODOLOGY

The methodology of research indicates the general pattern of organizing the procedure for gathering valid and reliable data for the purpose of investigation. This chapter deals with the description of the methods and different steps used for collecting and organizing data. It includes research design, research approach, setting, sample and sampling techniques, development and description of tools, pilot study, data collection procedures and plan for data analysis.

RESEARCH APPROACH

The research approach selected was quantitative approach. The study was based on the observation and assessment of Peripheral Artery Disease and Diabetic Peripheral Neuropathy. So it was considered as an appropriate approach for this present study.

RESEARCH DESIGN

Researcher's over all plans for obtaining answers to the research questions or for testing the research hypothesis is referred to as research design. The essential question that research design concerned with was how the study subjects would be brought in to the research and how they would be employed with the research design. This was a non experimental design that provided factual information about the existing condition .Here the descriptive survey research design was used. This refers to the collection of data directly from the study subjects used by questionnaire or interview. When subject respond to survey, their responses are known as self reports.

VARIABLES

Independent variables

The variable that is believed to causes or influences the dependent variables. The independent variable in the study is Diabetes Mellitus that has effects on peripheral artery disease and Diabetic Peripheral Neuropathy.

Dependent variables

The outcome variable of interest, the variable that is hypothesized to depend on or be caused by another variable is the independent variable. In the present study it refers to patients having Diabetic Peripheral Neuropathy and Peripheral Artery disease.

SETTING OF THE STUDY

This study was conducted in urban area (Choolai) which belong to the north zone of Chennai corporation and it is very near to urban health post, It has got four wards covering total population of 56, 744. Totally there are 16 streets in Choolai area. Among these 16 streets, 6 streets are selected by simple random technique, using lottery method to conduct the present study. College of Nursing provides comprehensive care to the population. The 6 streets which have been selected to conduct the present study are T K Mudhali street, Aryamuthu Mesthri Street , Avadi Sreenivasan street , Andiappan Street Satanna Nayakan street, V.V Koil srreet.

POPULATION

Population is the entire aggregation of cases that meet a designed set of criteria. In this present study population are subjects who are having Diabetes Mellitus more than three years. The accessible population for the present study is clients having Diabetes Mellitus for more than three years residing at Choolai. The total diabetic population for the selected streets in Choolai is 1016.

TABLE-1: DISTRIBUTION OF POPULATION

S. No	Name of the street	Total population	Diabetic population
1	T.K. Mudhali street	2045	235
2	V.V. Koil Street	2800	274
3	Aryamuthu Mesthri Street	1654	167
4	Avadi Sreenivasan Street	1015	103
5	Andiappan Street	512	55
6	Satanna Nayakkan street	1823	182
	Total	9849	1016

SAMPLE AND SAMPLE SIZE

Sample refers to subject of a population selected to participate in a research study. In this present study the sample consisted of 300 subjects who are having diabetes mellitus more than 3 years. Simple random sampling techniques were adopted to select the subjects.

SAMPLING TECHNIQUE

Sample consist a total number of 300 diabetic patients residing at Choolai area who are selected from 6 streets of Choolai namely of T K Mudhali street, VV Koil street, Aryamuthu Mestri street, Avadi Sreenivasan street, Andiappan street, Satanna Nayakan street. Sampling technique used for the present study to select the street was simple random technique by lottery method. The investigator conducted a survey in the Choolai area to identify the total number of diabetic clients. In Choolai area 6 streets were surveyed and a total number of diabetic clients were 1016 and each client in particular street has been numbered and sample has been selected by simple random sampling by lottery method in each street. Required number of diabetic patients was selected as the sample. The sample selection of each street was given below.

TABLE-2: SAMPLING TECHNIQUE

S. No	Name of the street	Samples fulfill the inclusion criteria	Selected samples
1	T.K. Mudhali street	188	81
2	V.V. Koil Street	162	69
3	Aryamuthu Mesthri Street	96	41
4	Avadi Sreenivasan Street	84	36
5	Andiappan Street	36	16
6	Satanna Nayakkan street	132	57
	Total	698	300

SAMPLING CRITERIA

Inclusion criteria

The sample was selected within the following predetermined criteria:-

- Clients who are having diabetes mellitus more than 3 years
- Clients who are aged between 35-75 years and residing in Choolai
- Clients who are willing to participate in this study

Exclusion criteria

- Clients who are having type I diabetes mellitus
- Clients who are having known neurological problems
- Clients who have diabetes mellitus less than 3 years.

DEVELOPMENT OF TOOLS

Data collection tools are the instruments used by the investigator to observe or measure the key variable in the research problem.

The structured interview scheduled, observation checklist and rating scale were developed based on the objectives of the study through review of literature, personal consultation and discussion with the nursing experts, content validity of the tool, pre testing of tool, reliability testing of tool and preparation of blue print. All these helped in the ultimate development of the tool.

DESCRIPTION OF THE TOOL

Instruments used in the study consist of four sections.

Section 1 : Demographic data which includes age, sex, religion, occupation, education, family income, type of food and so on.

Section 2 : Diabetic neuropathy examination scale is a rating scale, it evaluates muscle strength, reflex and sensation based on scoring from 0 to 2.

Section 3 : Intermittent claudication questionnaire is the observation checklist used to find out the certain characteristic of intermittent claudication..

Section 4 : Ankle brachial index is the rating scale that is measured by the ratio between the brachial pressure and ankle Pressure.

SCORING AND INTERPRETATION

Diabetic Neuropathy Scale is a rating scale. The total score was 16, for each observation the maximum score is 2 and minimum score is zero. If the patients get above 3 they are considered as having Diabetic Peripheral Neuropathy.

Ankle Brachial Index is the rating scale that is measured by the ratio between the brachial pressure and ankle Pressure. The ratio value is 0.9 or above considered normal.0.7 to 0.89 is considered moderate, 0.5-0.69 is considered very severe level of Peripheral Artery Disease.

TESTING OF THE TOOL

Content Validity

In order to measure the content validity, the tool was given to two experts from community health nursing department. Experts were requested to judge the items for their clarity and relevance, comprehensiveness and appropriateness of the content. Appropriate modifications were made in each section as per the suggestions given by the experts.

Reliability

Reliability of the tool was assessed by using interrater method. Reliability correlation coefficient value is 0.85. This correlation coefficient is very high and it is good tool for assessing the prevalence of Peripheral Artery Disease and Diabetic Peripheral Neuropathy among Type-II Diabetic clients.

PILOT STUDY

The pilot study is a trial run for major study to test the reliability, practicability, appropriateness and feasibility of the study. A formal permission was obtained form the medical officer and zonal officer of Puliyanthope Zone which covers Choolai and Besant Nagar. The pilot study was done for a period of one week from 21.03.2011 to 25.03.2011in community Besant Nagar area. 30 Samples were selected by simple random technique and assessment has been done for both Peripheral Arterial Disease and Diabetic Peripheral Neuropathy. The findings showed mild to moderate consistency and feasibility of the study, after which the plan for actual study was made.

DATA COLLECTION PROCEDURE

Formal written permission was obtained from the zonal medical officer Puliyanthope Chennai. The data collection was done for a period of one month from 29-8-2011 to 29-9-2011 and it was done by the investigator after getting consent from the patient based on the interview, assessment and observation techniques. The data was collected on all the days including Sunday. On an average 10 diabetic patients were interviewed and examined in a day in the morning and in the after noon session as well. Interview technique was used to gather information regarding demographic data. Observation has been made to find out intermittent claudication and assessment techniques were used to check for ankle brachial index and diabetic neuropathy examination scale.

Procedure for Ankle Brachial Index

The investigator keeps the patient in supine position to obtain brachial artery systolic pressure. Place the sphygmomanometer around the lower leg. Inflate the cuff until pedal pulse disappear then slowly deflate the cuff and note the pressure reading when the system resumes, then calculate ratio between brachial artery pressure and ankle pressure.

Diabetic Neuropathy Examination

Diabetic Neuropathy patients are examined by the investigator with Diabetic Neuropathy Examination Scale. It measures Muscle strength, Reflex, Sensation based on scoring from 0 to 2. Maximum score in the scale is 16 points. Patients who score more than 3 are considered as Diabetic Neuropathy positive

Evaluation of Muscle Strength

Quadriceps Muscle –The investigator keep the patient to sit with knees over side of the table, holding on the table. The investigator places her hand under the distal end of the thigh to cushion that part against table pressure. Patient is asked to extend the knee joint without rotation of the thigh. Resistance is applied by the investigator against the leg above the ankle, in the direction of flexion

Tibialis Anterior –The investigator keeps the patient to sit over side of the table or supine lying. The investigator supports the leg just above the ankle joint. Patient is asked to dorsiflex the ankle joint and invert the foot, without extension of the great toe. Resistance is applied by the investigator against the medial side, dorsal surface of the foot, in the direction of plantar flexion of the ankle joint and eversion of the foot

Evaluation of Reflex –The patient can be examined in two positions to check Achilles tendon The investigator keeps the patient to sit over a high couch, Dorsiflex the foot at the ankle. The patient is asked to relax then the Achilles tendon is struck with the reflex hammer. The contraction of the plantar flexor at the ankle is watched and felt.

Evaluation of Sensation to Pinprick - The investigator check the sensation of Pinprick is done using the sharp end of the safety pin or re- shaped paper clip. The sharp point is applied over the patient's big toe. The patient is asked to verbally indicate when a stimulus is felt.

Evaluation of Touch - The investigator check the touch using a fine wisp of cotton, the patient's great toe skin is lightly touched, avoiding pressure. The patient is asked the patient to verbally indicate whenever a touch is felt.

Evaluation of Vibration- The investigator check the vibration sensation with the great toe unsupported. The investigator tests the Vibration sensation bilaterally using a 128 Hz tuning fork placed over the dorsum of the great toe on the bony prominence of the distal inter phalangeal joint. Patients with their eyes closed, will be asked to indicate when they can no longer sense the vibration from the vibrating tuning fork.

Evaluation of Joint Position Sense – The investigator **g**rasp the patient's great toe, holding it by its sides between her thumb and index finger and then pull it away from the other toes so as to avoid friction. The investigator demonstrates "up" and "down" as she moves the patient's great toe clearly upward and downward. Then, with the patient's eyes closed, ask for a response of "up" or "down" when moving the great toe in a small range of motion.

Intermittent Claudication Questionnaire

This is the questionnaire which is used by the investigator to observe intermittent claudication and classify the clients according to the severity and pain. This observation check list helps the investigator to identify the Peripheral Artery Disease

PLAN FOR DATA ANALYSES

Data collected were analyzed including both descriptive and inferential statistics such as mean, chi-square test and co relation co- efficient.

Descriptive statistics

Frequency and percentage distribution was used to analyze the demographic characteristics of the samples.

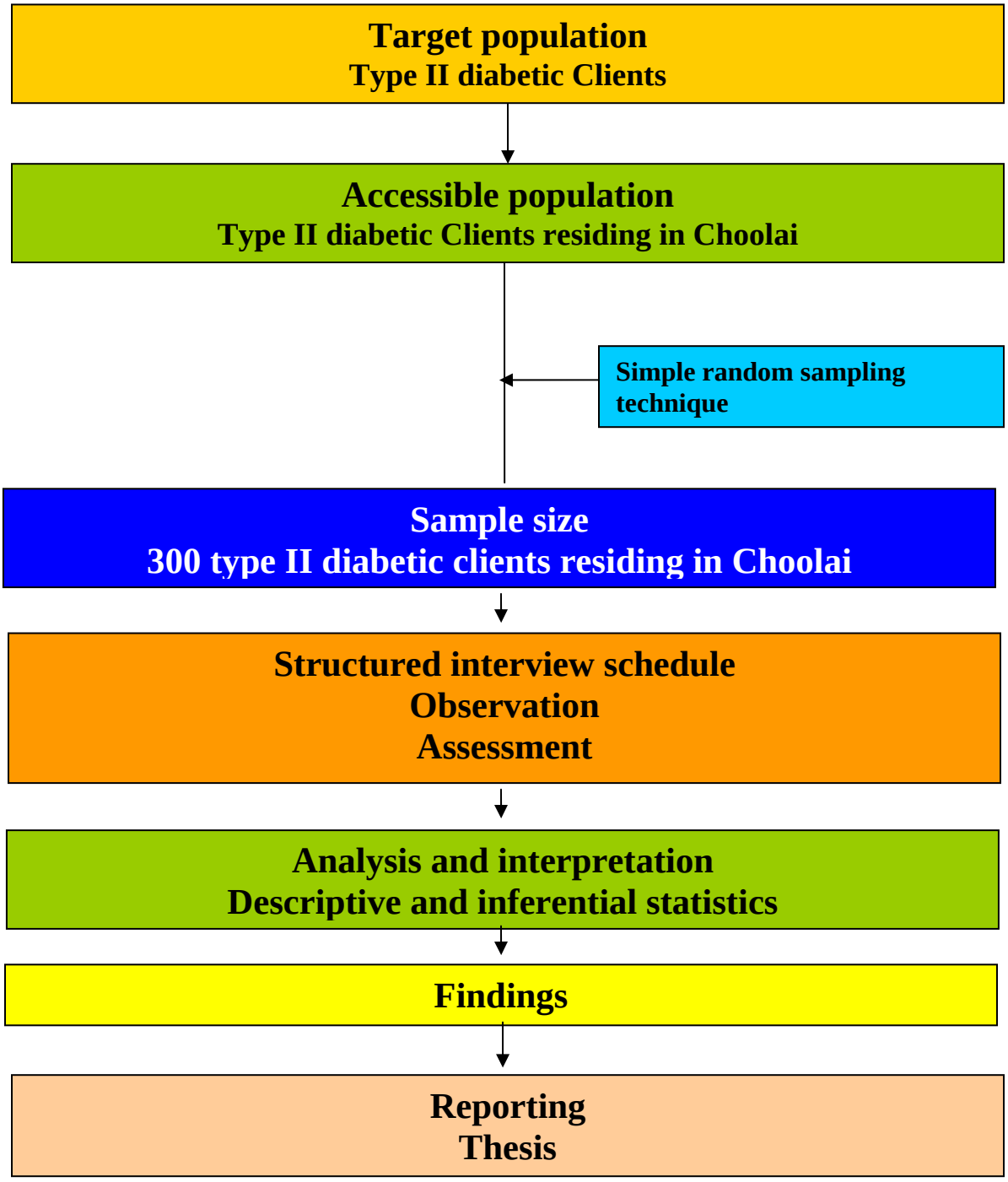
Inferential statistics

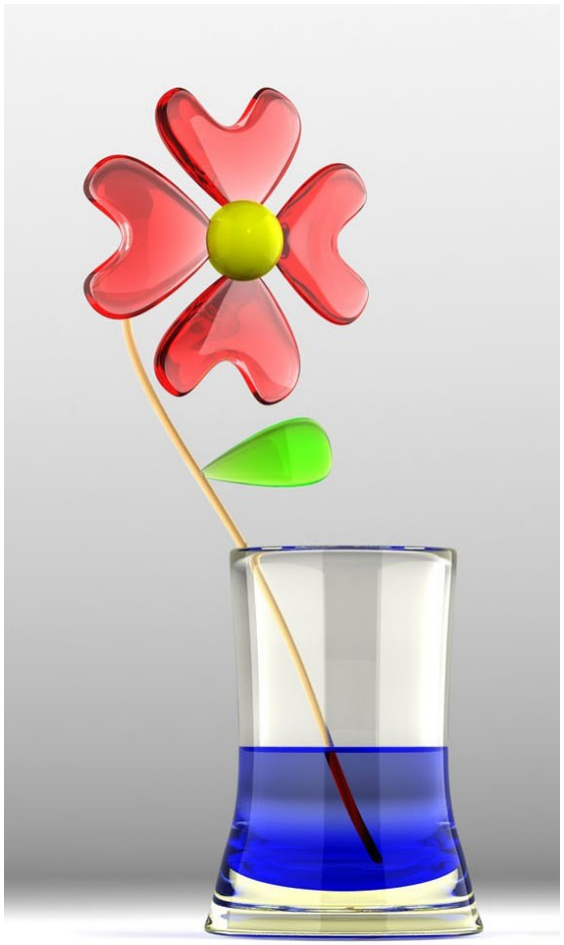
- Co-relation co efficient was used to assess the relationship between Diabetic Peripheral Neuropathy and Peripheral Artery Disease.
- Chi-square test was used to associate the demographic variables and Diabetic Peripheral Neuropathy and Peripheral Artery Disease.

ETHICAL CONSIDERATION

The proposal of the study was approved by the experts prior to the pilot study by the ethical committee. Each individual client was informed about the purpose of the study. Informed consent was obtained, assurance was given to them that confidentiality and privacy would be maintained. The client was informed that he or she was having the freedom to leave the study.

FIG-2: SCHEMATIC REPRESENTATION





Data Analysis & Interpretation

CHAPTER – IV

ANALYSIS AND INTERPRETATION

Statistical analysis of data enables researchers to organize, evaluate, interpret, summarize and communicate numeric information. Descriptive statistics is used to describe data and Inferential statistics to draw inferences about a population based on data collected from the sample. The data collected from 300 diabetic clients was tabulated, analyzed and interpreted based on their objectives by using Descriptive and Inferential statistics based on the objectives of the Study.

The findings have been presented under the following headings

Section I- Distribution of demographic characteristics of type II Diabetic clients

Section II –Percentage distribution of Intermittent Claudication for peripheral artery disease among type II Diabetic clients

–Percentage distribution of Ankle Brachial Index for Peripheral Artery
Disease among type II diabetic clients

Section III- Percentage distribution of Diabetic Neuropathy Examination score among type II diabetic clients.

-Correlate the findings of Diabetic Peripheral Neuropathy with Peripheral Artery Disease

Section IV--Association between Peripheral Artery Disease findings with selected demographic variables

Section V- Association between Diabetic Peripheral Neuropathy findings with selected demographic variables.

Section –I: Distribution of demographic data

Table-1: Percentage Distribution of demographic data of Type – II Diabetic patients **N=300**

Demographic variables		No. of patients(300)	%
Age	40 -45 yrs	60	20.0%
	46 -50 yrs	68	22.7%
	51 -56 yrs	83	27.7%
	>56 yrs	89	29.7%
Gender	Male	145	48.3%
	Female	155	51.7%
Education	No formal education	69	23.0%
	Primary	78	26.0%
	Middle	72	24.0%
	Secondary	55	18.3%
	College	26	8.7%
Occupation	Labour/coolie	63	21.0%
	Govt employee	61	20.3%
	Private employee	65	21.7%
	Business	60	20.0%
	Not working	51	17.0%
Marital status	Married	243	81.0%
	Un married	18	6.0%
	Widow /Widower	30	10.0%
	Divorcee/ Separated	9	3.0%
Type of family	Nuclear family	267	89.0%
	Joint family	33	11.0%
Religion	Hindu	262	87.3%
	Muslim	18	6.0%
	Christian	10	3.3%
	Others	10	3.3%
Income	Rs. 1000-2000	44	14.7%
	Rs. 2000-3000	48	16.0%
	Rs. 3000-4000	92	30.7%
	>Rs.4000	116	38.7%
Type of diet	Vegetarian	28	9.3%
	Non vegetarian	272	90.7%

Table -1 shows that the majority of clients 89 (29.7%) are from the age group of above 56 years, 155 (51.7%) are females, 78 (26%) of patients have secondary level education. Many of them 65 (21.7%) are private employees, regarding marital status 243 (81%) are married. Majority of 267 (89%) patients from nuclear family, 262 (87.3%) of patients from Hndu, 116 (38.7%) have income above Rs.4000/-, 272 (90.7%) are non vegetarian.

SECTION –I

Table-2: Distribution of diabetic related information of Type-II diabetic patients N=300

Demographic Variables		No. of patients(300)	%
Duration of illness	3-6 years	73	24.3%
	7-10years	71	23.7%
	11-15 years	84	28.0%
	>15 years	72	24.0%
Life style changes	Never	122	40.7%
	Very often	142	47.3%
	Frequently	36	12.0%
Habit of smoking or tobacco chewing	Yes	45	15.0%
	No	255	85.0%
Type of medication	Oral hypoglycemic agents	268	89.3%
	OHA&INSULIN	15	5.0%
	Siddha	9	3.0%
	Ayurvedic medicine	8	2.7%
Family History of Diabetes mellitus	Father/mother	228	78.9%
	Grandfather/Grand mother	16	5.5%
	Siblings	36	12.5%
	Relatives	9	3.1%
Secondary complication	Foot ulcers	11	3.7%
	Tingling sensation in the foot	107	35.7%
	Recurrent infection	96	32.0%
	Any other complication	86	28.7%
Eexposure to health information	Health education	69	23.0%
	News paper	59	19.7%
	Magazine	61	20.3%
	Health personnel	72	24.0%
	Family members	39	13.0%

Table- 2 depicts that majority of 84 (28%) patients are suffering with diabetes between 11 – 15 years, 142 (47.3%) of patients have life style changes. Only 45 (15%) have the habit of smoking or tobacco chewing. Majority of 268 (89.3%) patients on oral hypoglycaemic agent, 228 (78.9%) of clients having family history of diabetes. Most of them 107 (35.7%) have developed tingling sensation in the foot. Many of them 72 (24%) are seeking health information from health personnel.

SECTION-II: Percentage distribution of Intermittent Claudication for peripheral artery disease among type II Diabetic clients

Table 3: Checklist for identifying intermittent claudication

N=300

S. No.	Criteria for identifying intermittent claudication	Response			
		Yes		**No**	
		n	%	**n**	**%**
1	Calf muscle pain or discomfort	78	26%	222	74%
2	Absence of pain during standing or sitting	78	26%	222	74%
3	Pain on walk uphill or hurry	78	26%	222	74%
4	Pain on ordinary pace walking (Yes – moderate/ Mild)	78	26%	222	74%
5	Pain goes away during standing	78	26%	222	74%
6	Pain disappear within 10 minutes	78	26%	222	74%

Table –3 shows that one fourth of diabetic clients 78 (26%) had intermittent claudication and got almost equal proportion of response for all aspects of the check list.

SECTION II: Percentage distribution of Ankle Brachial Index for Peripheral Artery Disease among type II diabetic clients

Table 4-: Rating Scale for Identifying Ankle Brachial Index

N=300

Ankle Brachial Index	No. of older adults	%
Normal(>90)	222	74.0%
Mild(0.70 – 0.89)	48	16.0%
Moderate(0.50 – 0.69)	30	10.0%
Severe(<0.50)	0	0.0%
Total	300	100%

Table-4 reveals that 48 (16%) of diabetic patients had mild level of Peripheral Artery Disease and 30 (10%) of diabetic patients had moderate level of Peripheral Artery Disease.

FIGURE-3 PERCENTAGE DISTRIBUTION OF PERIPHERAL ARTERY DISEASE

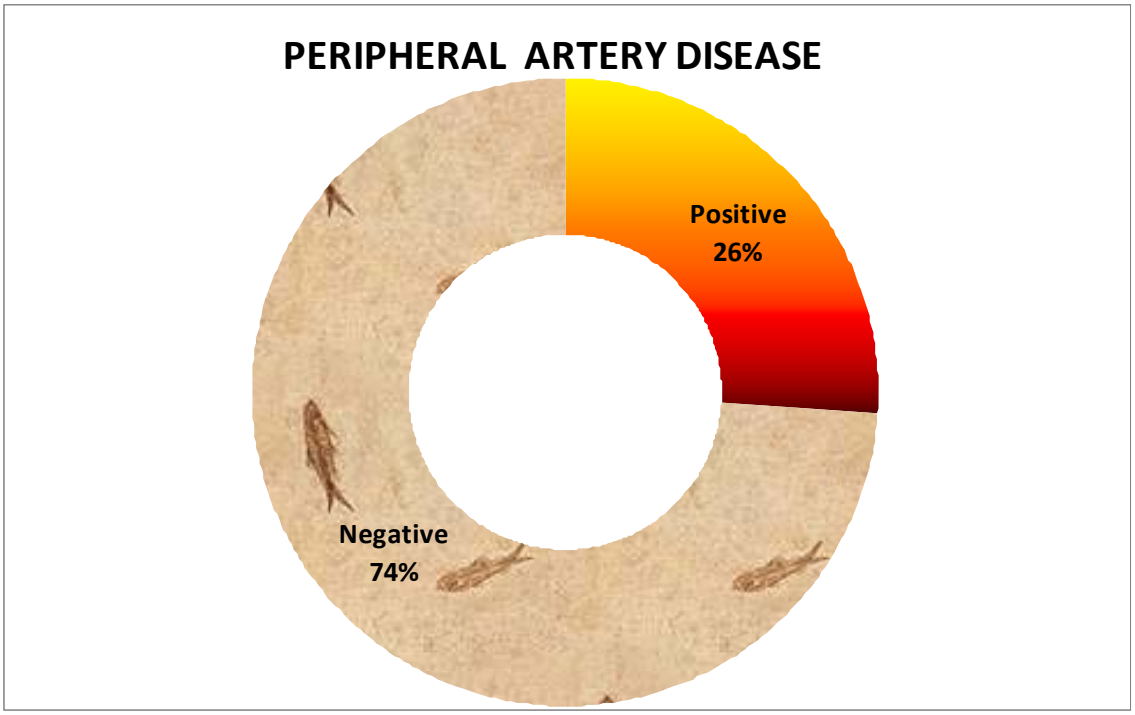


Figure-3 Shows that one fourth of the diabetic patients 78 (26%) had Peripheral Artery Disease.

SECTION – III: Percentage distribution of Diabetic Neuropathy Examination score among type II diabetic clients.

Table 5: Diabetic Neuropathy Examination Scores N=300

S. No	Content	Scores					
		Absent (2)		Decreased (1)		Normal (0)	
1	Quadriceps femoris:	0	0.0%	96	32%	104	68%
2	Tibialis anterior	0	0.0%	96	32%	104	68%
3	Reflex: Triceps surae	0	0.0%	96	32%	104	68%
4	Sensitivity to pinpricks	0	0.0%	96	32%	104	68%
5	Sensitivity to touch	0	0.0%	96	32%	104	68%
6	Sensitivity to pinpricks	0	0.0%	96	32%	104	68%
7	Vibration perception	0	0.0%	96	32%	104	68%
8	Sensitivity to joint position	0	0.0%	96	32%	104	68%

Table- 5 Shows that 96 (32%) patients had Diabetic peripheral neuropathy and got equal proportion score for all aspects of diabetic peripheral neuropathy examination scale.

SECTION III: Correlate the findings of Diabetic Peripheral Neuropathy with Peripheral Artery

Table 6: Correlation between findings of Diabetic Peripheral Neuropathy with Peripheral Artery Disease N=300

		PAD		Total
		Positive	Negative	
DPN	Positive	65	31	96
	Negative	13	191	204
	Total	78	222	300

Table- 6 shows that 65 (22%) of diabetic patients are having both Peripheral Artery Disease and Diabetic Peripheral Neuropathy. So there is substantial correlation between Peripheral Artery Disease and Diabetic Peripheral Neuropathy by Kappa agreement statistics **=0.64 (P=0.01).**

FIGURE -4: PERCENTAGE DISTRIBUTION OF DIABETIC PERIPHERAL NEUROPATHY

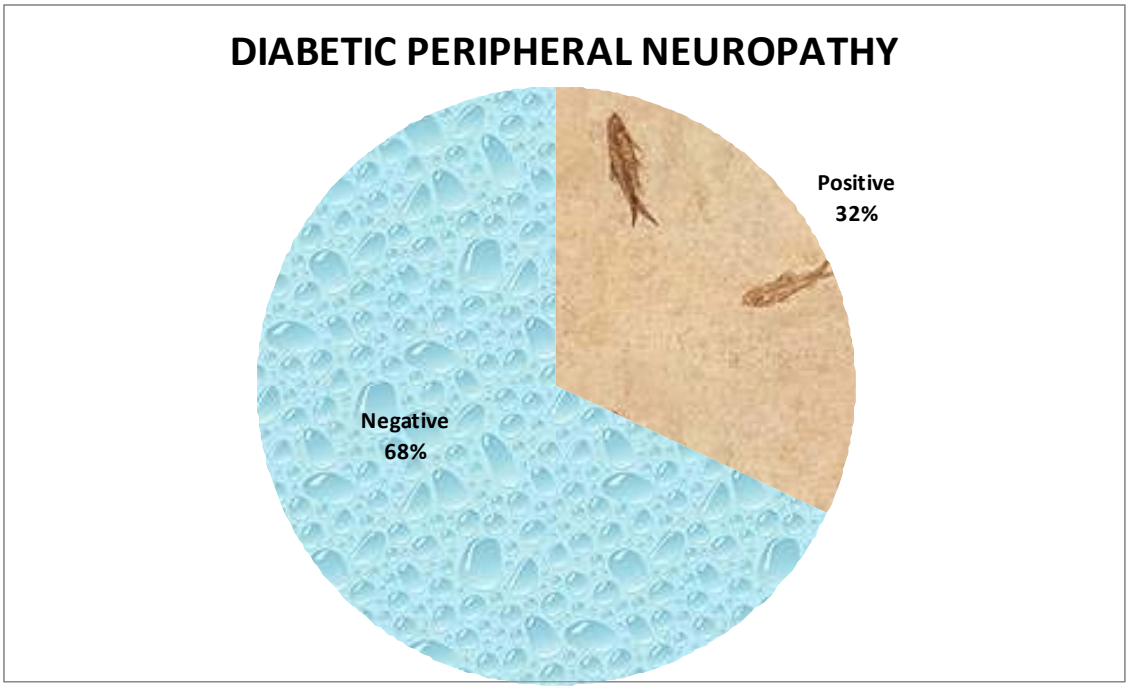


Figure-4 shows that one third of the diabetic clients 96 (32%) had Diabetic Peripheral Neuropathy.

SECTION-IV: Association between Peripheral Artery Disease findings with selected demographic variables

FIGURE-5: Association between peripheral artery disease and age.

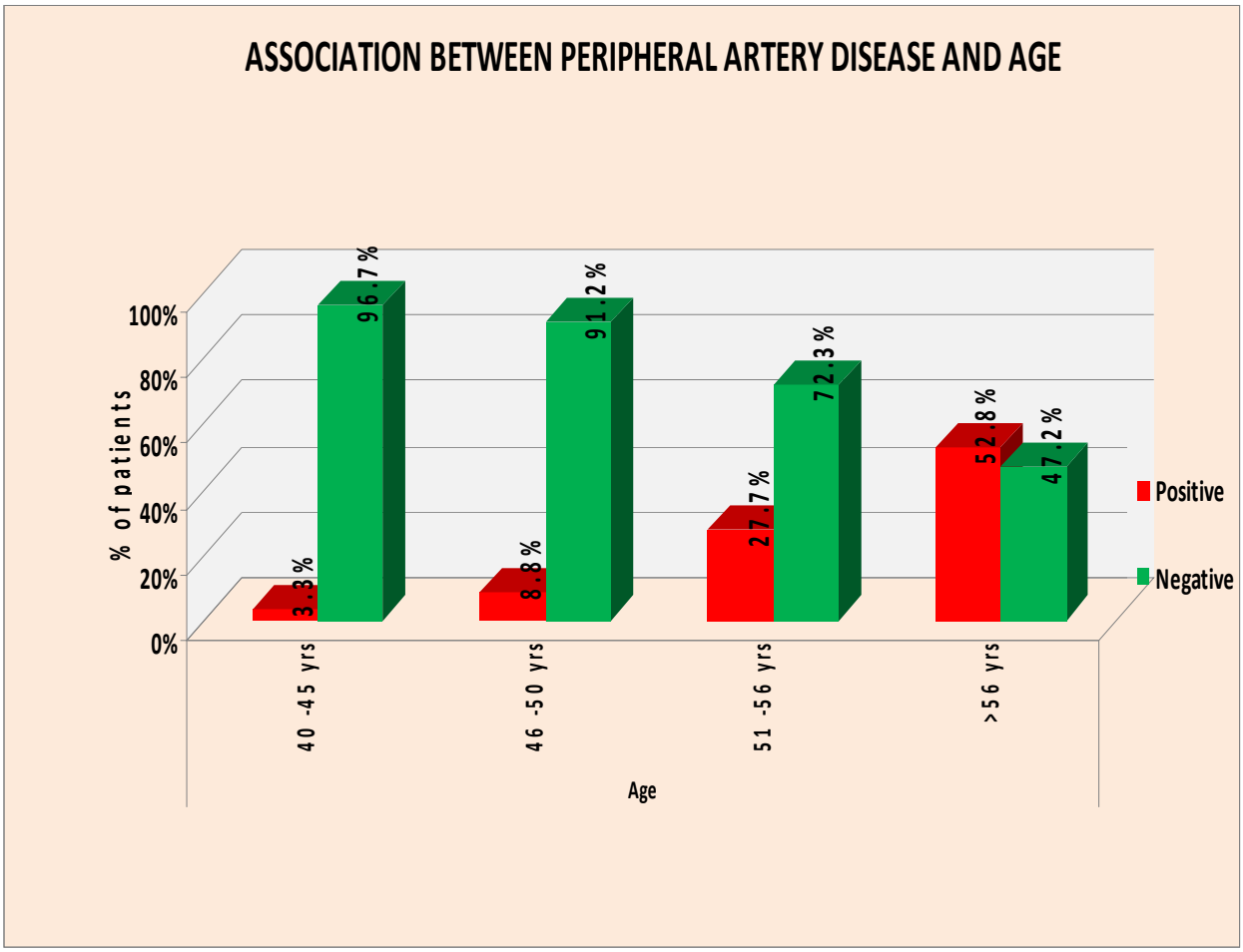


Figure-5 Shows that (52.8%) of clients are above 56 yrs. So there is strong association between Peripheral Artery Disease and advancing age (P=.001). Because the age increases changes in the blood vessels also increases and this results in Peripheral Artery Disease.

FIGURE-6: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND GENDER.

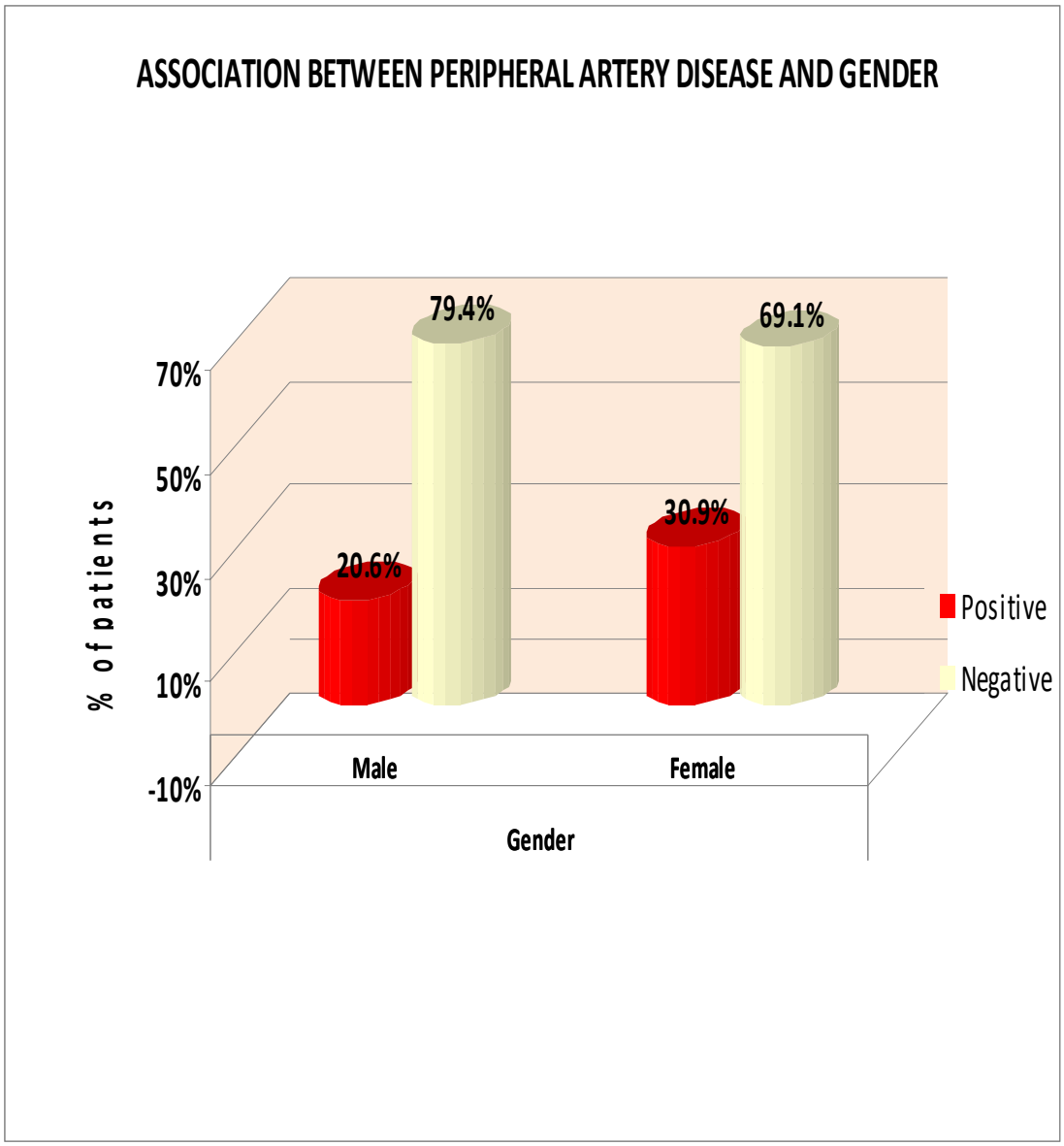


Figure-6 Shows that (30.9%) of clients are female. So there is moderate association between Peripheral Artery Disease and gender (P=.04), because females are more prone to get Peripheral Artery Disease than males

FIGURE-7: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND OCCUPATION.

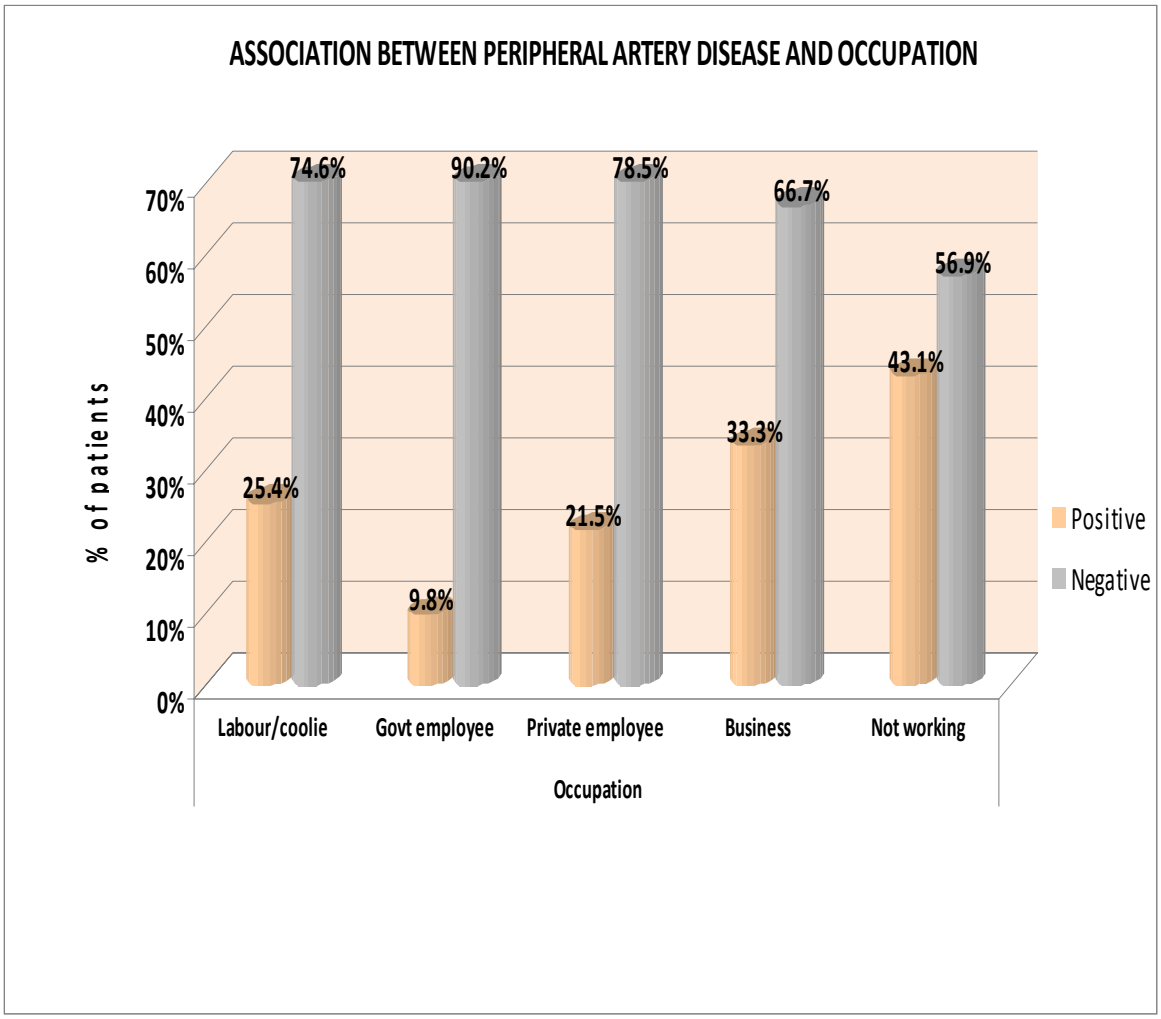


Figure-7 Shows that (43.1%) of clients are not working. So there is moderate association exists between peripheral artery disease and occupation (P=.01), because reduced activity is one of the reasons for developing Peripheral Artery Disease.

FIGURE-8: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND TYPE OF FAMILY.

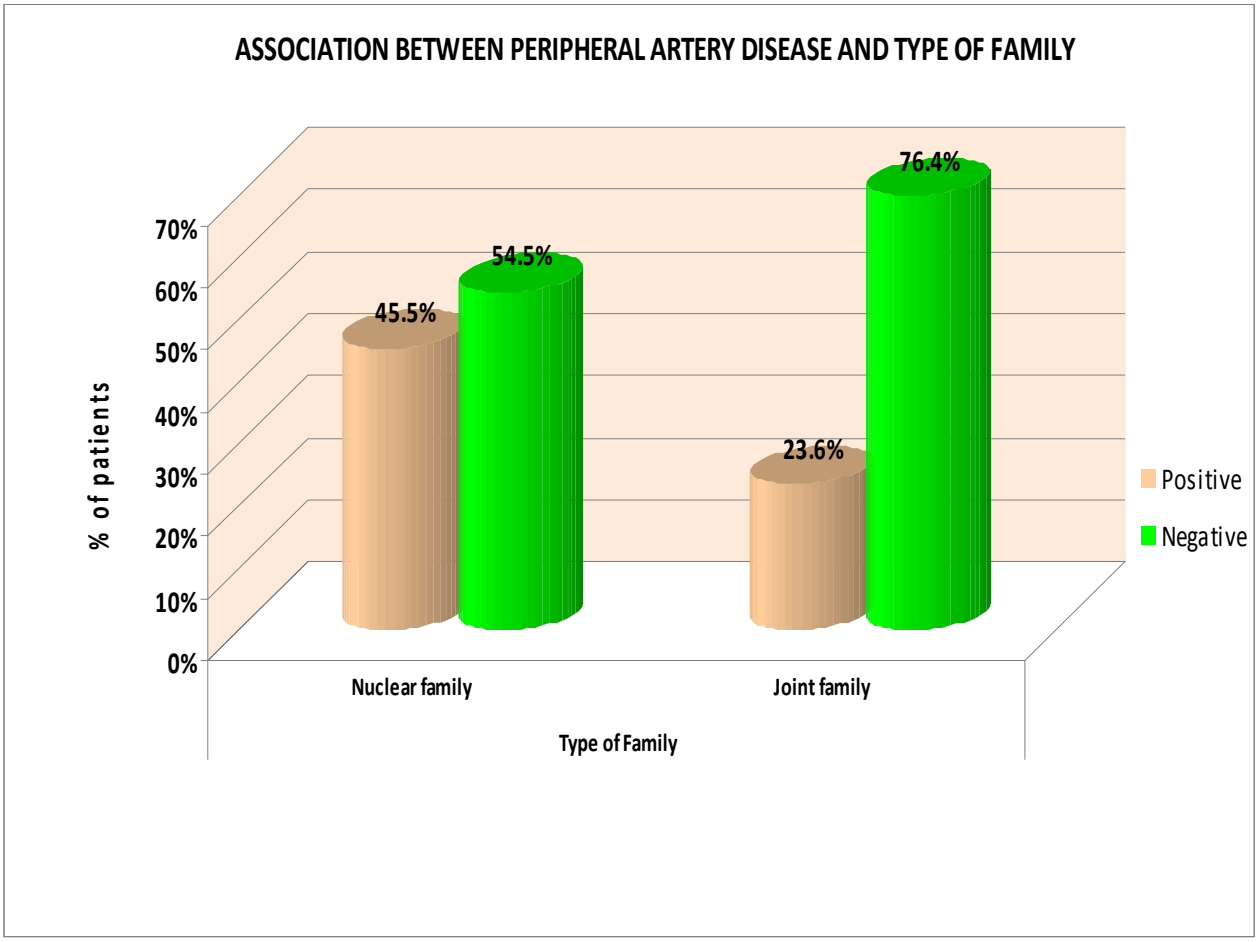


Figure-8 shows that (45.5%) of clients are living in nuclear family. So there is moderate association exists between Peripheral Artery Disease and type of family (P=.01). Hence patients living in the nuclear family do not find time to take care of themselves and also there are no supportive members in their families.

FIGURE-9: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND DURATION OF ILLNESS.

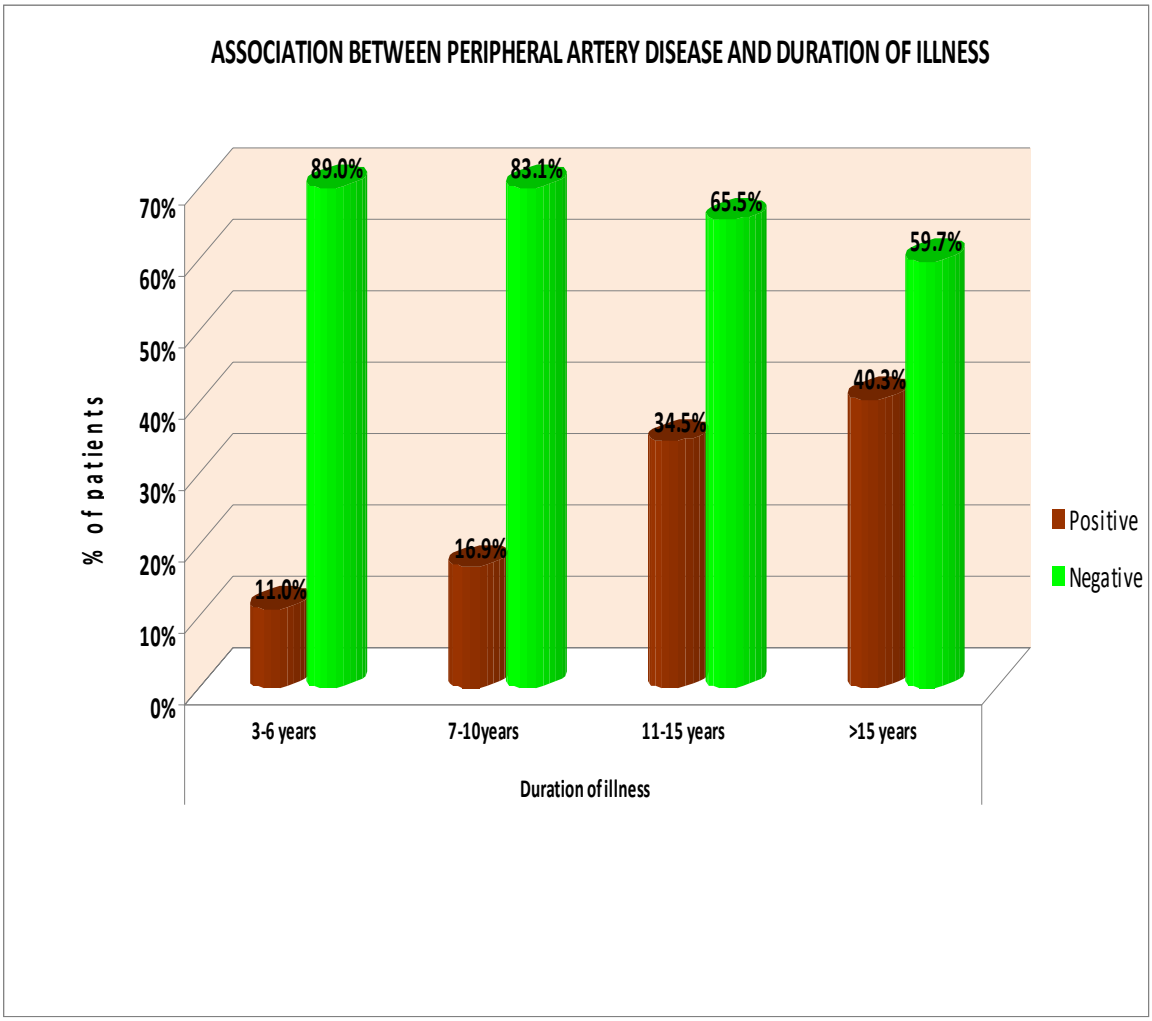


Figure-9 shows that (40.3%) of patients suffering with diabetes more than 15 years .So there is strong association exists between Peripheral Artery Disease and duration of illness (P=.001). There fore the duration of illness increases, changes in the blood vessels also increases.

FIGURE-10: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND LIFE STYLE CHANGES.

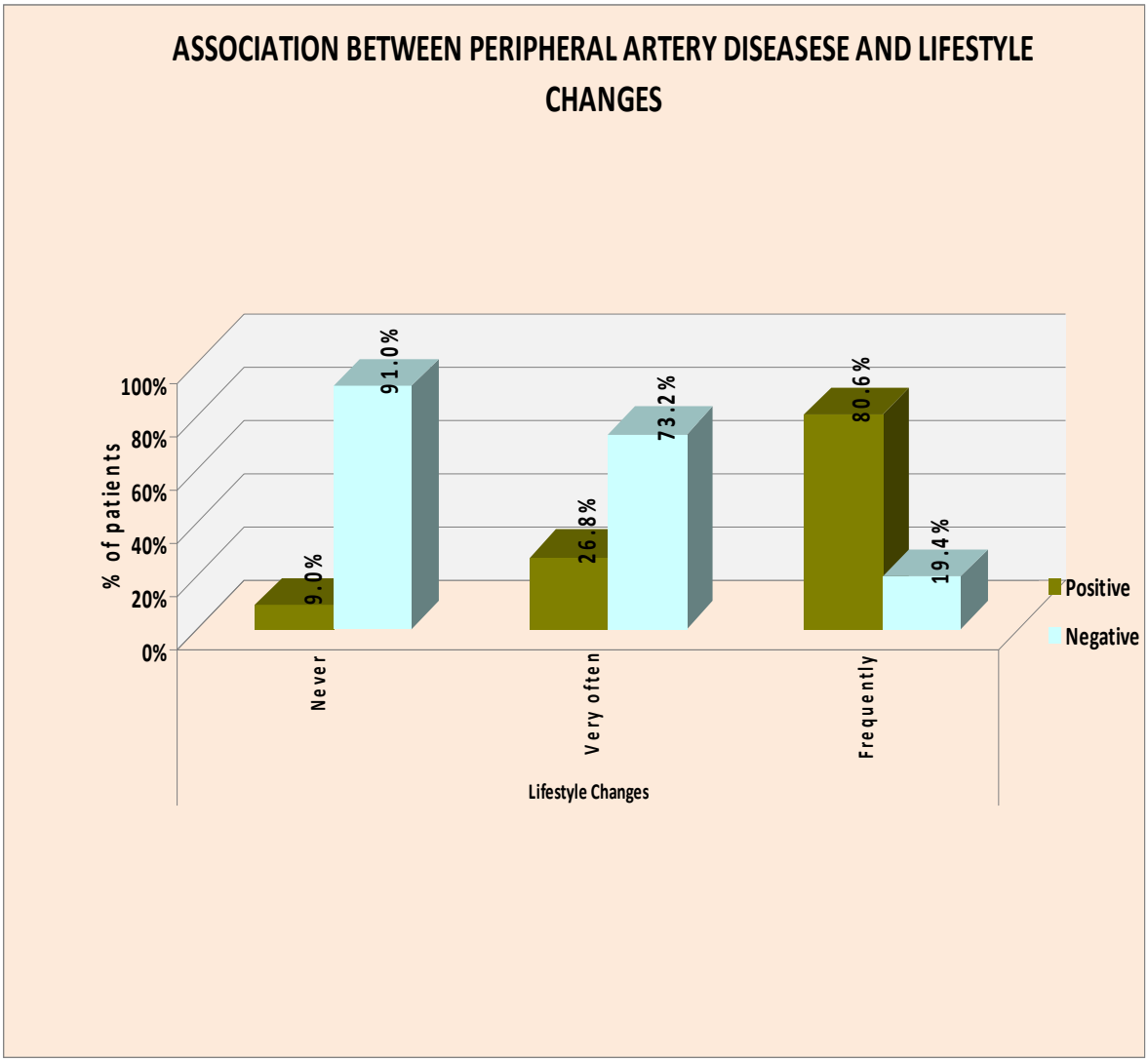


Figure-8 Shows that (80.6%) of clients are frequently affected by diabetes mellitus. So there is strong association exists between life style changes and Peripheral Artery Disease (P=.001). Diabetic interference in the normal activities changes the life style which results in Peripheral Artery Disease.

FIGURE-11:ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND HABIT OF SMOKING OR TOBACCO CHEWING.

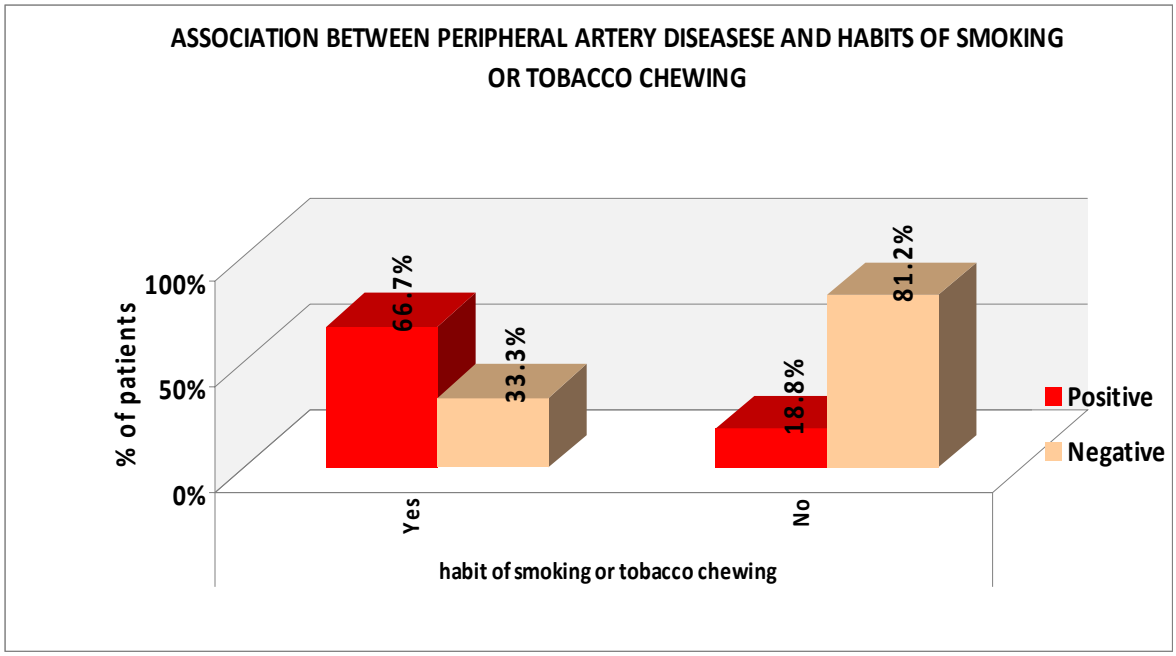


Figure-11Shows that (66.7%) of clients are having the habit of smoking or tobacco chewing. So there is strong association exists between Peripheral Artery Disease and habit of smoking or tobacco chewing (P=.001).There fore the nicotine presents in tobacco and cigarette causes vaso constriction and vascular changes.

FIGURE-12: ASSOCIATION BETWEEN PERIPHERAL ARTERY

DISEASE AND FAMILY HISTORY.

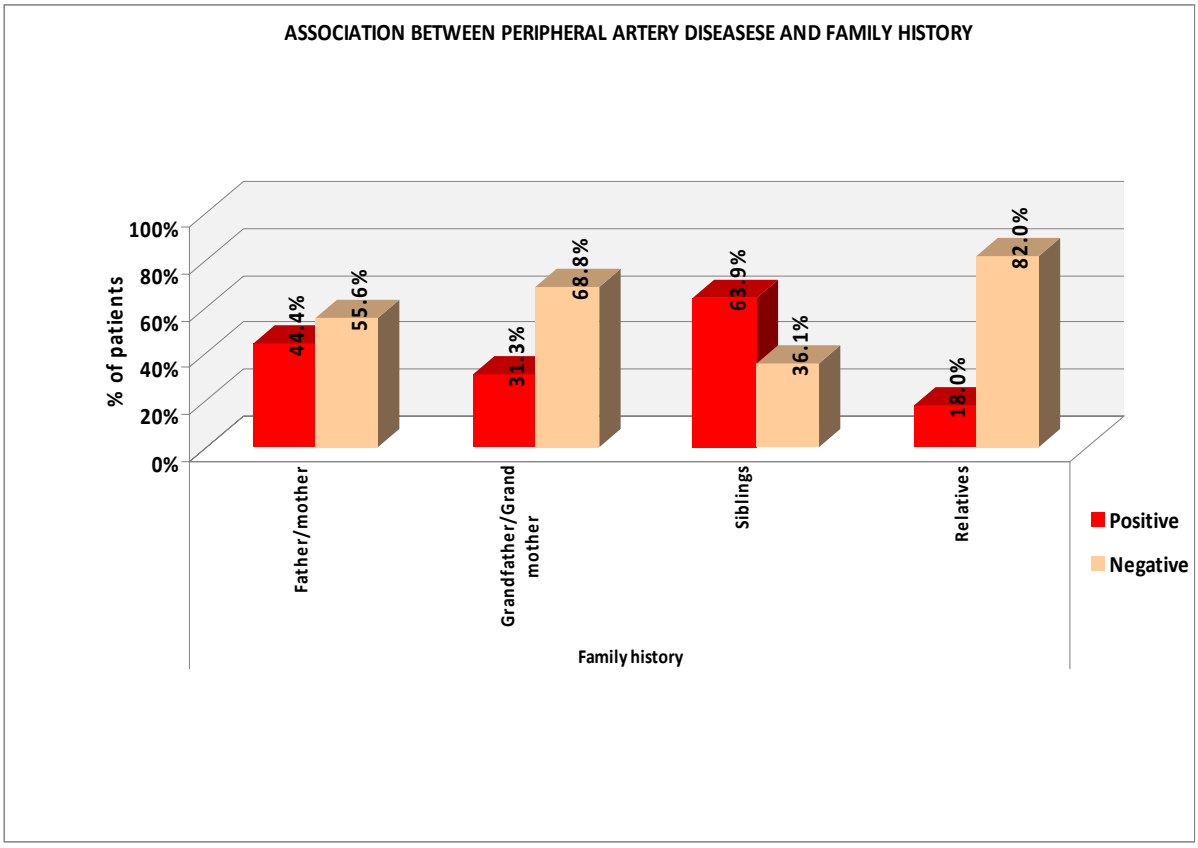


Figure-12 Shows that (63.9%) of patients are having family history of diabetes (Siblings). So there is strong association exists between first degree family relationship and Peripheral Artery Disease (P=.001). There fore hereditary play a major role in the development of diabetic complications.

FIGURE-13: ASSOCIATION BETWEEN PERIPHERAL ARTERY DISEASE AND SECONDARY COMPLICATIONS

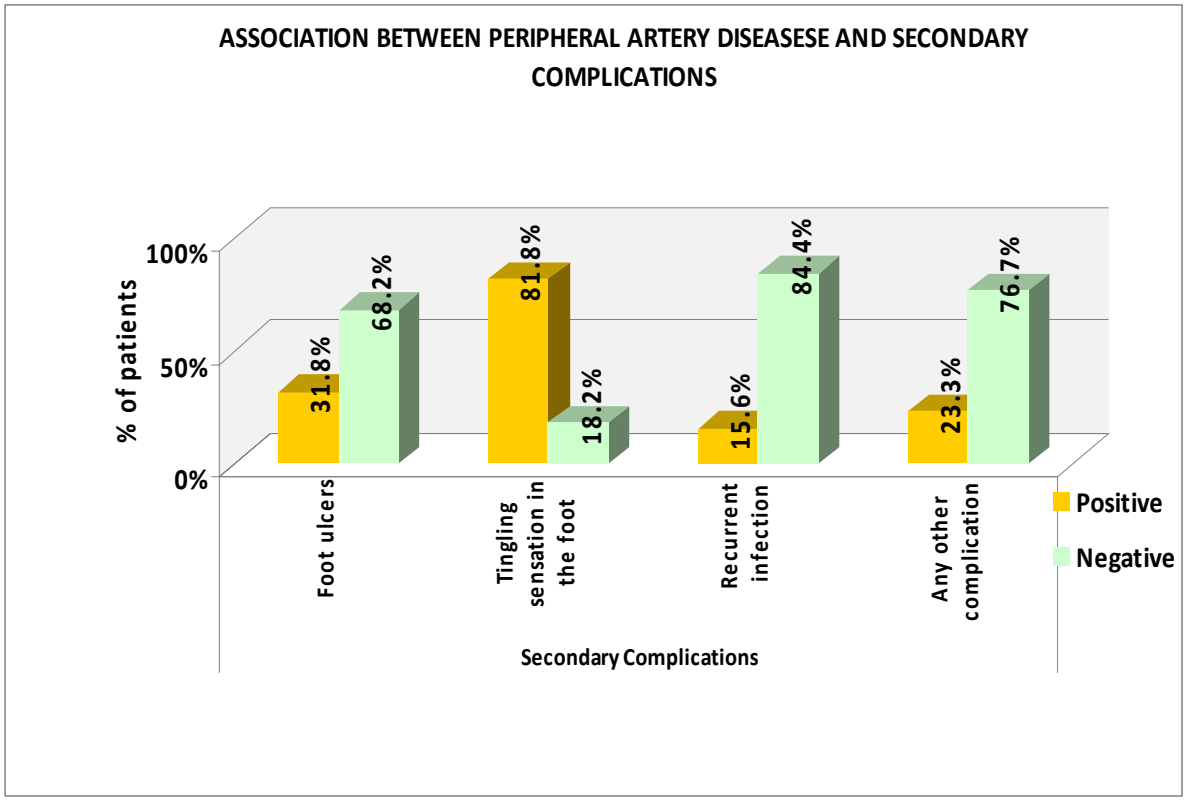


Figure-13 Shows that (81.8%) of the patients are having tingling sensation in the foot, so there is strong association between the secondary complications of diabetes and Peripheral Artery Disease (P=.001). Because tingling sensation caused by reduced blood supply in the lower extremities.

SECTION-V: Association between Diabetic Peripheral Neuropathy findings with selected demographic variables.

TABLE -7: Association between diabetic peripheral neuropathy and their demographic data

N=300

Demographic variables		DPN					Pearson chi square test
		Positive(96)		Negative(204)			
		n	%	n	%	Total	
Age	40 -45 yrs	9	15.0%	51	85.0%	60	$\chi 2$=23.37 P=0.001*** DF=3
	46 -50 yrs	18	26.5%	50	73.5%	68	
	51 -56 yrs	24	28.9%	59	71.1%	83	
	>56 yrs	45	50.6%	44	49.4%	89	
Gender	Male	55	37.9%	90	62.1%	145	$\chi 2$=4.53 P=0.03* DF=1
	Female	41	26.5%	114	73.5%	155	
Occupation	Labour/coolie	22	34.9%	41	65.1%	63	$\chi 2$=9.96 P=0.04* DF=4
	Govt employee	15	24.6%	46	75.4%	61	
	Private employee	17	26.2%	48	73.8%	65	
	Business	17	28.3%	43	71.7%	60	
	Not working	25	49.0%	26	51.0%	51	
Type of family	Nuclear family	80	82.3%	17	17.7%	97	$\chi 2$=4.63P=0.01* DF=1
	Joint family	16	7.8%	187	92.2%	203	

Table- 7 shows that the patients who are older (50.6%), Male (37.9%), not working (49%) and living in nuclear family (82.3%) developed DPN, so the age is highly significant (P=.001) with the disease, occupation (P= .04), Gender (P=.03) and type of family (P=.01) are moderately significant with the disease. Hence the age increases, diabetic complications also increases. Patients who are female, not working have reduced activity. Patients living in nuclear family are not given adequate care.

SECTION-V

TABLE- 8: ASSOCIATION BETWEEN DIABETIC PERIPHERAL NEUROPATHY AND THEIR DIABETIC RELATED DATA

N=300

Demographic variables		DPN				Total	Pearson chi square test
		Positive (96)		Negative (204)			
		n	%	n	%		
Duration of illness	3-6 years	15	20.5%	58	79.5%	73	$\chi 2$=9.82 P=0.02* DF=3
	7-10years	19	26.8%	52	73.2%	71	
	11-15 years	30	38.1%	52	61.9%	82	
	>15 years	32	41.7%	42	58.3%	74	
Life style changes	Never	27	22.1%	95	77.9%	122	$\chi 2$=13.27 P=0.001*** DF=2
	Very often	50	35.2%	92	64.8%	142	
	Frequently	19	52.8%	17	47.2%	36	
Family History of Diabetes mellitus	Father/mother	64	28.6%	160	71.4%	224	$\chi 2$=11.93 P=0.001*** DF=3
	Grandfather/ Grand mother	6	24 %	19	76 %	25	
	Siblings	22	56.4%	17	43.6%	39	
	Relatives	4	25.9%	8	74.1%	12	
Secondary complications	Foot ulcers	8	72.7%	3	27.3%	11	$\chi 2$=13.61P=0.001** DF=3
	Tingling sensation in the foot	41	38.3%	66	61.7%	107	
	Recurrent infection	24	25.0%	72	75.0%	96	
	Any other complication	23	26.7%	63	73.3%	86	

Table- 8 shows that the patients are suffering with diabetes more than (41.7%) 15yrs, normal activities frequently affected by diabetes (52.8%) ,first degree family relationship (56.4%), (72.7%) have foot ulcers developed DPN. So the duration of illness (P=.02) is moderately significant, family history, diabetic interference and sensory foot complication are highly (P=.001) significant. As the duration of illness increases, the diabetic complication also increases. Hereditary play a major role in the development of DPN. Frequent interference of diabetes in normal life, sensory changes are responsible for the neuropathy complications.

Discussion

CHAPTER-V

DISCUSSION

Foot ulcers are common in people with diabetes, especially those with problems in the nerves (peripheral neuropathy) and the blood supply to their legs (peripheral vascular disease). People with ulcers due to diabetes sometimes need an amputation (surgical removal of part of the limb). Foot ulcers not only lead to physical disability and loss of quality of life but also causes economic burden (health care costs, industrial disability). The aim is therefore to prevent foot ulcers occurring. The review of high level studies found that people with diabetes need to look after their feet seems to improve and prevent foot ulcer and also change their behavior in the short term. There is sufficient evidence that educating on additional preventive measures, will effectively reduce the occurrence of ulcers and amputations. This chapter deals with the discussion of the major findings of the study.

The data analysis revealed the following findings

The demographic data of the diabetic patients revealed that the majority of clients 89 (29.7%) were from the age group of above 56 years and most of the patients were females 155 (51.7%). The educational status reveled that majority of the patients 78 (26%) had secondary level education and with regard to working condition maximum number of the patients were private employees 65 (21.7%), Regarding marital status, major proportion of the clients 243 (81%) were married.

About type of family majority of the clients were from nuclear family 267 (89%). With regard to religion maximum number of clients 262 (87.3%) were Hindu and about the income major proportion of the clients 116 (38.7%) had income above Rs 4000/- food habits revealed that majority of the clients 272 (90.7%) were non vegetarian.

The diabetic related information revealed that majority of them 84 (28%) were suffering with diabetes between 11 – 15 years and Very often 142 (47.3%) of diabetic

patients had disturbance in normal activities, only 45 (15%) had the habit of smoking and tobacco chewing. Regarding the medication major proportion of the clients 268 (89.3%) were taking oral hypoglycemic agent, most of the clients107 (35.7) developed tingling sensation in the foot. Many of them 72 (24%) were seeking health information from health personnel.

The first objective of the study was to assess the prevalence of peripheral artery disease among Type – II Diabetic patients

The first objective represented the level of peripheral artery disease. It was evident after the assessment of prevalence , the presence of peripheral artery disease were 26% (78) out of total 300 diabetic clients , that was one fourth of the diabetic patients had Peripheral Artery Disease. The remaining 74% (222) diabetic clients were not having peripheral artery disease.

Most of the diabetic patients were taking medication and also aware of the complications of diabetes in urban areas, in spite of that they develop the later complications of diabetes mellitus. In the urban areas apart from government hospitals and health centres, private hospitals are also available. In order to prevent these complications, there is a need for need for health workers to check their conditions on regular basis.

This findings were consistent with the study done by **Edward W. Gregg et al (2006)** conducted a study to assess the Prevalence of Lower-Extremity Disease among 2873 Adult Population ≥40 Years of Age With and Without Diabetes in U.S .The results revealed that the prevalence of lower extremity disease was approximately twice as high for individuals with diagnosed diabetes (PAD 25%, PN 38.5%;any LED 28.7.%) as the over all population.

These findings were consistent with Jeffrey W et al (2009) conducted a study among 3947 men and women aged 60 and older to know about peripheral artery disease and its diagnosis and management in New York . 22% of the adult population had PAD

and the prevalence was equal in men and women. Strong associations exist between advancing age and the prevalence of PAD. Almost 20% of adults older than 70 years had PAD,

The second objective of the study was to assess the prevalence of Diabetic peripheral Neuropathy

The second objective represented the level of diabetic peripheral neuropathy. It was evident after the assessment of prevalence , the presence of diabetic peripheral neuropathy were 32% (96) out of total 300 diabetic clients , that was one third of the diabetic clients had Diabetic Peripheral Neuropathy .The remaining 68% (104) diabetic clients were not having diabetic peripheral neuropathy.

Though diabetic clients on medications they develop the later complications of diabetic peripheral neuropathy. So this can be prevented by regular nursing care in the community settings, especially the foot care is very important to avoid this complication.

This findings were consistent with Andreas **MIielick et al (2008),** conducted a study to know the Prevalence of Poly neuropathy among 393 Pre- Diabetes and Diabetes in Ausburg Germany. The prevalence of peripheral neuropathy was 28.0% in the diabetic subjects, 13.0% in those with IGT, 11.3% in those with IFG, Age, waist circumference, and diabetes were independent factors significantly associated with peripheral neuropathy, whereas in the diabetic group peripheral neuropathy was associated with age, waist circumference, and peripheral arterial disease (PAD).

These findings were consistent with **K.Rabia et al (2007)** Conducted study to know the Prevalence of Peripheral Arterial Disease, Diabetic peripheral neuropathy among 200 Patients with Diabetes Mellitus at Primary Care Setting in Malaysia**.** The prevalence of PAD was 16% (n=32, ABPI < 0.9). The prevalence of peripheral neuropathy was 41%. There was significant association found between age, gender,

ethnic groups, duration of DM, HbA1C levels, gangrene, smoking, hypertension, dyslipidaemia, and PAD in these diabetic patients

The third objective was to associate the selected demographic variables with findings of Peripheral Artery Disease

Third objective of the study represented the association between PAD and few demographic variables such as age and occupation were highly significant (P=.001), not working, type of family (P=.01), Gender (P=.04) were moderately significant. Because the older Diabetic patients (52.8%), female (30.9%), not working (43.1%), living in nuclear family (45.5%) developed Peripheral Artery Disease. It also explained the association between PAD and few diabetic related variables such as the duration of illness, normal activity frequently affected by diabetes , family history, tingling sensation in the foot were highly significant(P=.001). Patients were suffering with diabetes (40.3%) more than 15 yrs, normal activities frequently affected (80.6%) by diabetes , smoking (66.7%), first degree family relationship (63.9.%), tingling sensation (81.8.%) in the foot had developed Peripheral Artery Disease.

There fore, as the age increases complications of diabetes also increases, Female patients and who are not working had reduced activity and so they developed the disease. Patients living in nuclear family are given adequate care. The duration of illness increases complications. Smoking, tobacco chewing is the major reason for PAD, because Nicotine causes vasoconstriction in the blood vessels and reduces the blood supply. Heredity also play a major role, Diabetic interference in normal activity and loss of sensation in the foot are responsible for Peripheral Artery Disease.

.

This findings were consistent with **Reiber GE et al (2009),** conducted study to know the risk factors for amputation among 316 patients with diabetes mellitus in Seattle medical centre in Washington. Selected vascular, neuropathy, environmental, health care, self care, nutritional, metabolic, lifestyle, and psychosocial variables were measured in all patients before surgery. Statistically significant variables identified from analysis included insufficient below-knee and foot cutaneous circulation; ankle-arm blood

pressure index less than 0.45; absence of lower leg vibratory perception ; low levels of high-density lipoprotein (HDL) and no previous outpatient diabetes education. Strong association between age, Gender, socioeconomic status, diabetes type, duration, severity and peripheral vascular disease.

This findings were consistent with the study done by **Asis-ul-Hassan et al (2006)** conducted study to know the Prevalence of peripheral arterial disease among 830 type 2 diabetics in Pakistan. The prevalence of peripheral arterial disease was 31.6%. There was no significant difference in the proportion of low ABI between males (30%) and females (33%). Patients with low ABI were found to have significantly higher BMI and waist circumference .The most common symptom in the patients with low ABI was pain on walking (84%), followed by numbness of the feet (64%). Association was found between age, low ABI, duration of diabetes mellitus, cigarette smoking and PAD.

The fourth objective was to associate the selected demographic variables with findings of Diabetic Peripheral Neuropathy disease

The fourth objective represented the association between DPN and few demographic variables such as age (P=.001) was highly significant, occupation (P=.04), Gender (Male) and type of family (P=.01) were moderately significant. Because the patients who were older (50.6%), Male (37.9%), not working (49%) and living in nuclear family (82.3%) developed DPN, And also explained the association between DPN and few diabetic related variables such as the duration of illness (P=.02) was moderately significant, frequently affected, family history, foot ulcers were highly significant (P=.001) because the patients were suffering with diabetes (41.7%) more than 15yrs, normal activities frequently affected by diabetes (52.8%), first degree family relationship (56.4%), (72.7%) of clients had foot ulcers developed DPN.

Hence the age increases complications of diabetes also increases. Patients who were not working have reduced activity, developed the disease. Patients living in nuclear family do not find time to take care of themselves and also no supportive members in their family.

Duration of diabetes increases the complications and heredity play a major role. Diabetic interference in normal activity and sensory foot complications are responsible for Diabetic Peripheral Neuropathy.

This findings were consistent with **Mugambi- Nturibi E et al (2008)**, conducted study to know the Stratification of 218 persons with diabetes into risk categories for foot ulceration at National Hospital in Kenya. The prevalence of previous foot ulceration was 16% while that of previous amputation was 8%. Neuropathy was present in 42% of the study subjects and was significantly associated with age, male gender, duration of diabetes, random blood sugar, systolic blood pressure and the loss of foot sensation. Peripheral arterial disease was present in 22% and showed significant association with male gender. Foot deformities were observed in 46% of study subjects and were significantly associated with age, male gender, and presence of neuropathy.

The fifth objective was to correlate Peripheral Artery findings with Diabetic Peripheral Neuropathy findings

The fifth objective represented that there was a substantial correlation between Peripheral Artery Disease and Diabetic Peripheral Neuropathy (k=0.64), (P=0.01) by kappa agreement statement. Because 65 (22%) of diabetic patients were having both peripheral artery disease and diabetic peripheral neuropathy.

These findings were consistent with **Malgrange. D et al (2009)** Screened 664 diabetic patients at risk for foot ulceration in France. 40 (7.2%) had a history of foot ulcer or lower-limb amputation. Sensory neuropathy with loss of protective sensation was present in 37.1% of patients, whereas 27% had a peripheral arterial disease mainly based on the clinical examination. On addition, foot deformities found in 117 (21%) of patients. Patient with isolated peripheral arterial disease were considered as a separate risk group as was those with isolated neuropathy.

People who have both peripheral artery disease and diabetic peripheral neuropathy are more prone to get foot ulcerations, because their nerve supply will cut off

and blood supply will be reduced. So these people will be given special attention by health workers and teach them about foot care.

This findings were consistent with **Holeski JJ et al (2011)** conducted a study to know the Prevalence of foot pathology and lower extremity complications among 92 diabetic patients at outpatient clinic in Sanfrancisco. They found that abnormal cutaneous pressure sensation, intermittent claudication, and abnormal ankle brachial index were more significant pathologies among diabetics. 41% of insensate patients were not aware of their sensory deficit. In addition, one-thirds of the patients had peripheral vascular disease.

The sixth objective was to prepare Health Education Module on peripheral Artery Disease and Diabetic Peripheral Neuropathy.

The health education module which is prepared regarding PAD & DPN help the patients to develop awareness on these conditions and also to take necessary actions appropriately to prevent complications later.

This is supported by **Corbett CF et al (2006)** conducted study to test the effectiveness of an educational intervention to improve patient's foot care knowledge, self efficacy and self-care practices. Among 40 home care patients from a Medicare-certified home health agency, baseline measures of foot care knowledge, self-efficiency and reported self care practices were obtained at study entry and 6 weeks later to control group for foot care interventions provided during routine home care services. After obtaining the 6 week baseline measures, patients who were randomized to the intervention group received individualized education about proper foot care. A brief individualized educational intervention about standard foot care topics improved patients' foot care knowledge and self efficacy as well as reported self-care practices.

Summary, Conclusion, Implications & Recommendations

CHAPTER-VI

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS.

This chapter comprises the summary, conclusion, implications, recommendation and limitations of the study. The investigator undertook the study to assess the prevalence of Peripheral Artery Disease and Diabetic Peripheral Neuropathy among Type-II Diabetic clients residing at Choolai in Chennai and to prepare a Health Education Module.

The research hypothesis formulated was that there is significant relationship between Diabetes Mellitus and Peripheral Artery Disease. There is significant relationship between Diabetes Mellitus and Diabetic Peripheral Neuropathy

Review of literature was done from primary and secondary sources that formed the basis of selection of problem, formation of the tool, conceptual frame work and preparation of the protocol. The conceptual framework was based on the modified Becker health belief model (1974). It was an appropriate model which prescribed comprehensive framework to achieve the objectives of the study.

The research design used in this study was descriptive survey research design. The tool consisted of interview schedule for demographic variables. Diabetic neuropathy scale is a rating scale which measures certain characteristic of diabetic peripheral neuropathy. Intermittent claudication questionnaire is the observation checklist. Ankle brachial index is the rating scale that is measured by the ratio between the brachial pressure and ankle Pressure.

The pilot study was done for a period of one week in community Besant Nagar area. 30 Samples were selected by simple random technique and assessment has been done for both peripheral arterial disease and diabetic peripheral neuropathy. The findings showed mild to moderate consistency. Reliability of the tool was assessed by using

interrater method. Reliability correlation coefficient value is 0.85. This study was found to be feasible to proceed with main study. The main study was conducted on 300 type II diabetic clients residing at Choolai urban area in Chennai for a period of one month. The sample was selected on basis of simple random sampling technique.

The data collected from 300 diabetic clients was tabulated, analyzed and interpreted based on their objectives by using descriptive and inferential statistics.

Major findings of the study

- Majority of clients 89 (29.7%) were from the age group - above 56 years and 155 51.7%) were females.
- Most of them 78 (26%) had secondary level education
- Regarding working condition maximum number of 65 (21.7%) the patients was private employees
- Regarding marital status, major proportion of 243 (81%) the clients were married.
- Majority of the clients were from nuclear family 267 (89%).
- Maximum number of clients 262 (87.3%) were Hindu.
- Major portion of the clients 116 (38.7%) had income above Rs. 4000/-,
- Food habits revealed that majority of the clients 272 (90.7%) were non vegetarian.
- Majority of them 84 (28%) were suffering with diabetes, between 11 – 15 years
- Very often 142 (47.3%) of diabetic patients had disturbance in normal activities
- Only 45 (15%) had the habit of smoking and tobacco chewing.
- Regarding the medication major proportion of the clients 268 (89.3%) were taking oral hypoglycemic agent.
- Most of them (35.7%) developed tingling sensation in their foot,
- Many of them 72 (24%) were seeking health information from health personnel.
- One fourth of the diabetic clients 26% (78) had Peripheral Artery Disease and one third of the diabetic clients 32% (96) had Diabetic Peripheral Neuropathy.

- The association between PAD and few demographic variables such as age was highly significant (P=.001).Gender (P=.04), Occupation (P=.01), Type of family (P=.01) were moderately significant
- The association between PAD and few diabetic related variables such as the duration of illness, normal activity frequently affected by diabetes, Habit of smoking , family history, tingling sensation in the foot were highly significant (P=.001).
- There fore the advancing age and duration of diabetes increase the complications. Apart from this, diabetic related variables are responsible for vascular and sensory changes. Smoking and tobacco chewing cause vasoconstriction of the blood vessels and reduce blood supply in the extremities.
- The association between DPN and few demographic variables such as age, was highly significant (P=.001). Occupation (P=.04), Gender (Male) and type of family (P=.01) were moderately significant.
- The association between DPN and few diabetic related variables such as the duration of illness (P=.02) was moderately significant. Frequently affected by diabetes, family history, foot ulcers were highly significant (P=.001).
- So as the age increases, complications of diabetes also increase. Patients who are not working have reduced activities develop this disease. Patients living in nuclear family are not given adequate care. Duration of diabetes and its interference in the normal activities cause sensory changes.
- 65 (22%) of diabetic patients had both Peripheral Artery Disease and Diabetic Peripheral Neuropathy. So there was substantial correlation between Peripheral Artery Disease and Diabetic Peripheral Neuropathy by Kappa agreement statistics **=0.64 (P=0.01).**

CONCLUSION

The prevalence of Peripheral Artery Disease is 26% (78) and the prevalence of Diabetic Peripheral Neuropathy is 32% (96) out of 300 Diabetic patients. Strong association exists between the age, duration of illness and PAD, DPN. Diabetic related variables such as frequently affected by diabetes, family history, smoking and tobacco

chewing, tingling sensation in the foot are highly significant. Because advancing age and duration of diabetes increase the complications. Smoking causes vasoconstriction, reduces blood supply in the extremities and eventually lead to Lower Extremity Disease

A substantial correlation exists between Peripheral Artery Disease and Diabetic peripheral Neuropathy (k=0.64 P=0.01), because 65 (22%) of the diabetic patients have both Peripheral Artery Disease and Diabetic Peripheral Neuropathy. So diabetic complications are responsible for development of PAD and DPN, this ultimately results in foot ulcers.

IMPLICATIONS OF THE STUDY

The findings of the study can be used in the following areas.

Nursing Practice

- Nursing professionals working in the hospital setting will be able to find opportunities to teach about foot care and improve the knowledge of the patients regarding prevention of Diabetic Peripheral Neuropathy and Peripheral Artery Disease and there by reduce the complication of foot ulcers.

- Nurses should place health in the hands of the patient, especially for the Diabetic clients as they are in need of long term care. The Teaching Module developed by the Investigator can be used by the Nurses to educate the Diabetic clients on prevention of these complications.

Nursing Education

- The Community Health Nursing curriculum needs to be reorganized to enable Nursing Personnel to identify high risk diabetics, so as to provide supportive education to cope with proper management of Diabetes Mellitus.
- As a Nurse Educator, there is opportunity in ample measure for the Nursing professional to educate the diabetic clients and provide care in the clinical as well as in the community setting

- The study emphasizes the significance of the short term course for service Nurses in advanced knowledge on care of diabetics and in making use of facilities available in the management of Diabetes Mellitus

Nursing Administration

- The Nursing Administrator should take part in the making of Health Policy Development of protocols and standing orders with respect to Prevention of Diabetic Related complications of Peripheral Artery Disease, Diabetic Peripheral Neuropathy

- The Nursing Administrator should concentrate on the proper selection, placement and effective utilization of the Nurse in all areas giving opportunity for creativity, creating interest and enhance ability in educating the Diabetics.

Nursing Research

- The study helps the Nurse Researcher to develop insight into the development of Health Education Module and materials for Diabetics and Peripheral Artery Disease towards promotion of quality of life and prevention of foot ulcers.

LIMITATIONS

- The study findings cannot be generalized as the samples were only type II Diabetic clients.

RECOMMENDATIONS

On the basis of findings of the study, the following recommendations are being made.

- The Investigator recommended for Community Health Nurse to provide Health Education Module and conduct Mass Health Education on Peripheral Artery Disease and Diabetic Peripheral Neuropathy to prevent foot ulcers.
- The Investigator recommended for the government that the Urban Health Nurses, Rural Health Nurses focus more on non communicable diseases especially Peripheral Artery Disease and Diabetic Peripheral Neuropathy and teach them about foot care to prevent foot ulcers.

- A similar study can be replicated on a large scale sample along with type-I Diabetics and other settings to generalize the findings

- A similar study can be conducted among adult group with other associated disease like Hypertension

- A comparative study can be conducted between clients with type 1 and type 2 Diabetes Mellitus

- A comparative study can be undertaken to compare the findings from the rural and urban centre Diabetic clients.

- A study can be conducted to find out the practices of observation check list on prevention of Diabetic related complications.

Bibliography

BIBLIOGRAPHY

BOOK REFERENCES

1. Ansal & M. Berger (1983).**Diabetes Education in India**, Academic publishers.

2. Brunnar and Suddarth (2001), **Medical surgical Nursing**, Philadelphia; J.B,Lippincott Company, Newyork .

3. Ellenberg, Rifkins,(1990). **Diabetes Mellitus theory and Practice**, New York; Elsevier science Publication.

4. Knott M et al (1998) **Propericeptive neuromuscular facilitation: patterns and techniques.** 2nd edition. New York, Harper and Row Inc,

5. Hollis M,(2000) **Practical Exercise Therapy,** Reprinted1999, Oxford, Blackwell Scientific Publications,

6. Smettzer.C.S&Bare.B,(2004) **Text Book of Medical Surgical Nursing**,

   Philadelphia, Lippincott Williams and wilkins.

7. Thomas. N, Vasan. S (2004) **A Practical Guide to Diabetes Mellitus India**, Academic Publisher.

8. Potter A .P.Perry G.A (2003**) Basic Nursing Essentials for practice**, St.Louis, Mosby

9. Lynn S. et,al (2003) **Guide to physical Examination and History Taking**. 8th edition, Lippincott, Williams and Wilkins.

10. Gill GV (1999) **Diabetes Mellitus in developing countries**. Text book of diabetes, oxford, Black well science.

11. Ignatavicius D.D,Workman.M.L(2006).**Medical Surgical nursing for collaboration care saunder**, Elsevier.

12. Marica stancope Lancaster (1992) **Community health Nursing**, London, Mosby.

13. Susan B.et al (2001) **Physical Rehabilitation: Assessment and Treatment**, 4th edition, Jaypee BrothersMedical Publishers (P) Ltd.

14. Catherine et al (1998) **Pathology: Implications for the Physical Therapist**, W.B.Saunders Company.

15. Michael Donaghy (2001) **Brain's Disease of Nervous System**, 11th edition ,Oxford publications.

16. Lorraine Williams Pedretti(2002), **Occupational therapy, Practice skills for Physical Dysfunction,** 4th edition, Mosby.

17. S.S.Adler, et al (2003):**Proprioceptive neuromuscular facilitation in Practice**, 2nd edition, Springer publications India.

18. Joyce M.Black (1998) **Medical-Surgical Nursing – Clinical Management for Continuity of Care.** 5th edition, New Delhi, W.B. Saunders.

19. Basavanthappa BT (1998) **Nursing Research – Review of Literature**, 1st edition, Jaypee Brothers, New Delhi.

20. William DB, (2001) **Therapeutic Exercises Techniques for Intervention**, Lippincott, Williams, and Wilkins,

21. Voss D.E et al (1996) **Proprioceptive Neuromuscular Facilitation**, Patterns and Techniques, 3rd edition, Lippincott Williams & Williams.

22. Kendall FP, et al (2003) **Muscles—Testing and Function with Posture**, Harcourt Brace, Asia.

23. Herman Wh et al (1998). **Glycemic Control and Micro vascular and Neuropathic Complications,** Diabet. Med.

24. Mohan V,Vijayaprabha (1996) **Complications in long-term south Indian NIDDM of over 25 years duration**. Diabetes Res.Clin.Prac.

25. JohnCP,Gareth W, **Textbook of Diabetes2**,3rd edition, Blackwell Publishing.

26. Baltimore, MD (1993), **Pain**. 4th edition., Lippincott, Williams, and Wilkins.

27. Seaquist ER (1998). **Microvascular complications of diabetes, Strategies for managing retinopathy, nephropathy and neuropathy**. Postgrad. Medicine

28. Merlin T et al (2005) **Anemia in Diabetes, An emerging complication of micro vascular disease**. Current Diabetes Reviews

29. Gurumani.N (2005) **An introduction to Biostatistics**, Eighth Edition, MJP Publications , Chennai.

30. Denise F. Polit (2008**) Nursing Research** ,Eighth Edition ,Lippincott Williams & Wilkins.

JOURNAL REFERENCES

1. MJ Fowler (2008) **Micro vascular and Macro vascular Complications of Diabetes,** Diabetes journals 2:26-77

2. RB Roaeid (2011) Prevalence **of long-term complications among Type 2 diabetics**, Journal of Diabetology, 3:5-10.

3. Indian Diabetic Amputation Study Group (2011) **The major cause for the occurrence of amputations,** journal of association of physicians of India 11:6-10.

4. PK Sahana (2011) **High Prevalence of Neuropathy and Peripheral Arterial Disease in Diabetes**, The Journal of Endocrinology 12:16-23

5. AJM Boulton (2004**) Neuropathy diabetic foot ulcers,** National endocrinology journal of medicine: 10:56-67.

6. N.M. Kamel et al (1999) **Sociodemographic determinants of management behavior of diabetic patients**, Eastern Mediterranean Health Journal; 5 (5): 974-983.

7. Michael Vallis et al (2005) **The Role of Diabetes Education in Maintaining Lifestyle Changes,** Canadian Journal of Diabetes, 5; 29 (3):193-202.

8. Zhaolan Liu (2010). **Prevalence of chronic complications of type 2 diabetes mellitus in outpatients,** Health and Quality of Life Outcomes 8:62 -70

9. S Jambart (2011**) Prevalence of Painful Diabetic Peripheral Neuropathy among diabetics,** The Journal of International Medical Research. 39:30-40

10. V.Mohan, (2010), **prevalence of diabetes related complications,** Journal of physician Associations of India 58:73-78.

11. Australian bureau of statistics (2008) **prevalence of diabetes among Indigenous people**, Australian and New Zealand Journal of Medicine; 9(3): 284-92;

12. Vijay viswanathan, (2006) **Prevalence of pathogens in diabetic foot infection in south Indian type 2 diabetic patients**, The Asian Journal of Diabetology 3: 9-11. .

13. K Rabia (2011**) peripheral arterial disease in diabetic patients,** Asia Pacific Family Medicine Journal.18; 11-21.

14. A Rahman(2009) **Vasculopathy in patients with diabetic foot,** Pakistan Journal of Medical Sciences 17:209-22

15. JS Al-Wakeel (2009) **Micro vascular and macro vascular complications in diabetic,** Saudi Journal of Kidney Diseases and Transplantation 23:43-76

16. IR Temidayo (2002). **Symptomatic peripheral neuropathy in a diabetic patient,** African Journal of Neurological Sciences: 3-28-35.

17. GR McAnulty (2000). **The incidence of micro vascular and neuropathy complications in types 1 and 2** ,oxford journals 1:80-85

18. T Erbas (2011) **prevalence of diabetic peripheral neuropathy among patients with diabetes,** Journal of clinical neuropathy.28:11-23

19. JC Mbanya - 2003. **Diabetes micro vascular and macro vascular disease in Africa,** Journal of Cardiovascular Risk. 10:97 –102.

20. K Mørkrid (2010) **Risk factors and prevalence of diabetic peripheral neuropathy:** Int J Diab ,Volume 30:86-96

21. SM Bergin (2009). A **questionnaire for determining prevalence of diabetes related foot,** Journal of footankleres.10; 15-20

22. Fatima Al-Mskari (2007) **Prevalence of risk factors for diabetic foot complications**, BMC Family Practice 2007, 8:59-75

23. AJM Boulton (2004) **Neuropathic diabetic foot ulcer,**nejm.48:352-368

24. Katherine L Bate and George Jerums (2003). **Preventing complications of diabetes,** Medical Journal of Australia ; 179 (9): 498-503

25. Metoo D (2004). **Clinical skills, Empowering People with Diabetes to Minimise Complications,** British. J. Nurs; 13: 644-651.

26. Vinik AI, Vinik E. (2003) **Prevention of Complications of Diabetes,** Am. J. Manag. Care; 9 : S 63-80.

27. Bailes Bk (2002) **Diabetes mellitus and its Chronic Complications,** AORN J; 76: 278-282

28. Bernd K(2004), **The Role of Urine Glucose Testing in the Management of Diabetes Mellitus**, Canadian Journal of Diabetes. 2004; 28(1):238-245.

29. 61.Helen Cooper (2002**). Diabetes education: the patient's perspective**, Journal of Diabetes Nursing 6: 91-95.

30. 62.Warren G et al (2001) **Multidisciplinary and psychosocial approaches to diabetes education,** J.Diab. Nursing.5 (5): 156-159.

NET REFERENCES

https://www.pubmed.com

https://www.googlescholar.com

https://www.medlar.com

https://www.yahoo.com

https://www.google.com

https://www.uptodate.com

https://www.uptodate.com

https://www.cochrane.org

https://www.medscape.com

https://www.medline.com

https://www.icea.com

https://www.macrhofdimes.com

https://www.awhonn.org

Appendices

SECTION- I : STRUCTURED INTERVIEW SCHEDULE

DEMOGRAPHIC DATA

INSTRUCIONS:
Kindly listen to the questioned asked by the interviewer carefully and provide necessary information by giving appropriate response

Please put a tick mark in the box provided

1. Age in Years:
a) 40-45 ( )

b) 46-50 ( )

c) 51-56 ( )

d) > 56 ( )

2. Gender
a) Male ( )

b) Female ( )

3. Education Status
a) Illiterate ( )

b) Primary ( )

c) Middle school ( )

(d) Secondary school ( )

e) College level ( )

4. Occupation
a) Labour/coolie ( )

b) Govt employee ( )

c) Private employee ( )

d) Business ( )

e) Not working ( )

5. Marital Status

a) Married ( )

b) Un Married ( )

c) Widow /Widower ( )

d) Divorcee/ Separated ( )

6. Type of Family

a) Nuclear ( )

b) Joint ( )

7) **Religion**

a) Hindu ( )

b) Muslim ( )

c) Christian ( )

d) Others ( )

8. Monthly Family Income in rupees

a) 1000-2000 ( )

b) 2001-3000 ( )

c) 3001-4000 ( )

d) Above 4000 ( )

9. Type of Diet

a) Vegetarian ( )

b) Non vegetarian ( )

( )

10. **Since how long you are diabetic?**

a) 3-6 years ( )

b) 7-10years ( )

c) 11-15 years ( )

d) > 15 years ( )

11. Does Diabetes interfere in your daily normal activities?

a) Never ( )

b) Very often ( )

c) Frequently ( )

12 Do you have the habit of smoking or tobacco chewing?

a) Yes ( )

b) No ( )

13. What type of medication are you taking?

a) Oral hypoglycemic agents ( )

b) OHA&INSULIN ( )

c) Siddha ( )

d) Ayurvedic medicine ( )

14. Do you have a Family History of Diabetes mellitus Relationship?

a) Father/mother ( )

b) Grandfather/Grand mother ( )

c) Siblings ( )

f) Relatives (Specify) ( )

15. What complications you have developed secondary to diabetes mellitus?

a) Foot ulcers ( )

b) Tingling sensation in the foot ( )

c) Recurrent infection ( )

d) Any other complication ( )

16. **Previous exposure to health information regarding Diabetes mellitus**

a) Health education ( )

b) News paper ( )

c) Magazine ( )

d) Health personnel ( )

e) Family members ( )

SECTION-II : DIABETIC NEUROPATHY EXAMINATION SCALE

S. No	Content	Score		
		Absent (2)	Decreased (1)	Normal (0)
	Muscle Strength			
1	Quadriceps femoris:			
2	Tibialis anterior			
3	Reflex: Triceps surae			
	Sensation of Index Finger			
4	Sensitivity to pinpricks			
	Sensation: big toe			
5	Sensitivity to touch			
6	Sensitivity to pinpricks			
7	Vibration perception			
8	Sensitivity to joint position			
	Total (16)			

SECTION - III

CHECKLIST FOR IDENTIFYING INTERMITTENT CLAUDICATION

If a patient describes pain or discomfort in the legs when they walk, the following questions to be asked

S. No.	Questions	Answers	
		Yes	**No**
1	Do you get pain or discomfort typically in the calf muscle? (Yes)		
2	Does this pain never begin when you are standing still or sitting? (yes)		
3	Do you get pain if you walk uphill or hurry? (Yes)		
4	Do you get pain if you walk at an ordinary pace on the level? (Yes – moderate/severe /No- Mild)		
5	If you stand still, does the pain go away? (Yes)		
6	Does pain disappear within 10 minutes or less when you stand still? (Yes)		

SECTION -IV

RATING SCALE FOR IDENTIFYING ANKLE BRACHIAL INDEX

S. No.	Ankle Brachial Index			
	>0.90 (Normal)	0.70 to 0.89 (Mild)	0.50 to 0.69 (Moderate)	<0.50 (Severe)
1				
2				
3				
4				
5				

ÀÌ¾¢ - 1

ÅÊÅ¨Áì¸ôÀð¼ §¿÷¸¡½ø §¸ûÅ¢¸Ç¢¢ý ¦¾¡ÌôÒ Å¢ÅÃí¸û Â¡×õ ¯í¸¨Ç ÀüÈ¢ÂÐ. ¦¾÷Ç¢Å¡¸ ±Ø¾×õ.

ÌÊÂ¢Âø °¡÷ó¾ ÌÈ¢ôÒ¸û

°¡¢Â¡É Å¢¨¼¸Ç¢ø (✓) ÌÈ¢Â¢¼×õ.

1) ÅÂÐ (¬ñÎ¸Ç¢ø)

«) 40 Ó¾ø 45 Å¨Ã
( )

¬) 46 Ó¾ø 50 Å¨Ã
( )

Þ) 51 Ó¾ø 56 Å¨Ã
( )

®) 56ìÌ §Áø
( )

2) À¡Ä¢Éõ

«) ¬ñ
( )

¬) ¦Àñ
( )

3) ¸øÅ¢ ¾Ì¾¢

«) ÀÊì¸¡¾Å÷
( )

¬) ¬ÃõÀ ¸øÅ¢
( )

Þ) ¯Â÷ ¿¢¨Ä ¸øÅ¢
( )

®) §Áø ¿¢¨Ä ¸øÅ¢
( )

¯) Àð¼¡¡¢/§Å¨Ä ÅöôÒì¸øÅ¢
( )

4) §Å¨Ä

«) ¾¢ÉìÜÄ¢
( )

¬) «ÃÍ §Å¨Ä
( )

þ) ¾É¢Â¡÷ §Å¨Ä
( )

®) ÍÂ ¦¾¡Æ¢ø
( )

¯) §Å¨ÄìÌ ¦°øÄ¡¾Å÷
( )

5) ¾¢ÕÁÉõ °¡÷ó¾ ¿¢¨Ä

«) ¾¢ÕÁ½Á¡ÉÅ÷
( )

¬) ¾¢ÕÁ½Á¡¸¡¾Å÷
( )

þ) Å¢¾¨Å
( )

®) Å¢Å¡¸Ãò¾¡ÉÅ÷
( )

6) ÌÎõÀ Å¨¸

«) ¾É¢ìÌÎõÀõ
( )

¬) ÜðÎìÌÎõÀõ
( )

7) Á¾õ

«) þóÐ Á¾õ
( )

¬) ÓŠÄ¢õ
( )

þ) ¸¢È¢òÐÅ÷
( )

®) ÁüÈ¨Å
( )

8) **ÌÎõÀò¾¢ý Á¡¾ ÅÕÁ¡Éõ**

«) 1000 Ó¾ø - 2000 Å¨Ã
( )

¬) 2001 Ó¾ø - 3000 Å¨Ã
( )

þ) 3001 Ó¾ø - 4000 Å¨Ã
( )

®) 4000ìÌ §Áø
( )

9) ¯½× Å¨¸

«) ¨°Åõ
( )

¬) «¨°Åõ
( )

10) ¿£¡¢Æ¢× §¿¡ö ±¾¾¨É ÅÕ¼í¸Ç¡¸ ¯ûÇÐ?

«) 3 Ó¾ø 6 Å¨Ã
( )

¬) 7 Ó¾ø 10 Å¨Ã
( )

þ) 11 Ó¾ø 15 Å¨Ã
( )

®) 15 ÅÕ¼í¸ÙìÌ §Áø
( )

11) ¿£¡¢Æ¢× §¿¡ö ¾¢É°¡¢ Åúì¨¸Â¢ø À¡¾¢ô¨À ±üÀÎòÐ¸¢È¾¡?

«) ´Õ§À¡Ðõ þø¨Ä
( )

¬) ±ô§À¡¾¡ÅÐ
( )

þ) «Êì¸Ê
( )

12) ¾í¸ÙìÌ Ò¨¸Â¢¨Ä/Ò¨¸ À¢ÊìÌõ ÀÆì¸õ ¯ûÇ¾¡?

«) ¬õ
( )

¬) þø¨Ä
( )

13) **±ó¾ Å¨¸Â¡É ÁÕóÐ Å¨¸¸¨Ç ±ÎòÐì¦¸¡û¸¢È£÷¸û?**

«) Å¡ö ÅÆ¢ Á¡ò¾¢¨Ã¸û
( )

¬) Å¡ö ÅÆ¢ Á¡ò¾¢¨Ã¸û ÁüÚõ þýÍÄ¢ý
( )

þ) °¢ò¾¡
( )

®) ¬Ô÷§Å¾¡
( )

14) **ÌÎõÀò¾¢É¡¢¨¼§Â Â¡Õì¸¡ÅÐ ¿£¡¢Æ¢× §¿¡ö ¯ûÇ¾¡?**

«) «ôÀ¡/«õÁ¡
( )

¬) ¾¡ò¾¡/À¡ðÊ
( )

þ) ¯¼ý À¢Èó¾Å÷
( )

®) ¦°¡ó¾ì¸¡Ã÷
( )

15) ¿£¡¢Æ¢× §¿¡¨Â ¦¾¡¼÷óÐ ²üÀð¼ À¡¾¢ôÒ¸û ±ýÉ?

«) À¡¾¾¢ø Òñ
( )

¬) À¡¾ò¾¢ø °°¢ §À¡ýÚ ÌòÐ¾ø
( )

þ) «Êì¸Ê ²üÀÎõ §¿¡ö ¦¾¡üÚ
( )

®) ÁüÈ¨Å
( )

16) ¿£¡¢Æ¢× §¿¡¨Â ÀüÈ¢Â «È¢×ò¾¢È¨É ±ùÅ¡Ú ¦¾¡¢óÐ ¦¸¡ñË÷¸û?

«) ÜðÎ °Ó¾¡Â ¸øÅ¢
( )

¬) Òò¾¸õ
( )

þ) Í¸¡¾¡Ãô À½¢Â¡Ç÷¸û
( )

®) ÌÎõÀò¾¢É÷/¿ñÀ÷¸û
( )

ÀÌ¾¢ - 3

¸Ïì¸¡ø ÅÄ¢Â¢¨É À¡÷¨ÅÂ¢Îõ ÀðÊÂø

§¿¡Â¡Ç¢ ¿¼ìÌõ§À¡Ð ¸Ïì¸¡Ä¢ø ÅÄ¢§Â¡ «øÄÐ «¦°ª¸¡¢Â§Á¡ ²üÀÎ§ÁÂ¡É¡ø, ¸£ú¸ñ¼ §¸ûÅ¢¸û §¸ð¸ôÀ¼§ÅñÎõ

Å. ±ý	§¸ûÅ¢¸û	À¾¢ø¸û	
		¬õ	þø¨Ä
1	¸Ïì¸¡ø ¾¨°Â¢ø ÅÄ¢§Â¡ («) Í¸Å£É§Á¡ ±üÀÎ¸¢È¾¡?		
2	«ó¾ ÅÄ¢, ±ô§À¡¾¡ÅÐ, ¿¢üÌõ§À¡Ð («) ¯ð¸÷óÐ þÕìÌõ§À¡Ð ²üÀÎ¸¢È¾¡?		
3	§Á§Ä ±Úõ§À¡Ðõ («) §Å¸Á¡ ¸ ¿¼ìÌõ§À¡Ðõ ¸Ïì¸¡ø ÅÄ¢ ¯ûÇ¾¡?		
4	°¡¾¡Ã½Á¡ ¸ ¿¼ìÌõ§À¡Ð, ÅÄ¢ ²üÀÎ¸¢È¾¡?		
5	¦¾¡¼÷óÐ ¿¢üÌõ§À¡Ð, ¸Ïì¸¡ø ÅÄ¢ ¿¢ýÚÅ¢Î¸¢È¾¡?		
6	«ùÅ¡Ú ¿¢üÌõ§À¡Ð, ÅÄ¢ 10 ¿¢Á¢¼ò¾¢§Ä¡ («) «¾üÌûÇ¡¸§Å¡ ¿¢ýÚÅ¢Î¸¢È¾¡?		